

**LOCATION/OFFICE : { PK2 4R13 }**

TO: Julie Anne Watko  
SUBJECT : Prior art online search  
DATE: April 1, 2003

Dear Julie Anne Watko

Please find attached the search results for 09811112. I used the search strategy I emailed to you to edit, which you approved. I searched the standard Dialog files, IBM TDBs and the internet.

If you would like a re-focus please let me know.

Thank you.

Pamela Reynolds  
EIC 2600 Team Leader  
306-0255  
3C03

63  
Access DB# 89865

## SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Julie Ann Votko Examiner #: 77602 Date: 03/25/2003  
Art Unit: 2652 Phone Number 301-7742 Serial Number: 0981112  
Mail Box and Bldg Room Location CPK 1B3 Results Format Preferred (circle): PAPER DISK E-MAIL  
107.1608.01 DE 4D22

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*  
Please provide a detailed statement of the search topic and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Using an ultrasonic rotary piezoelectric actuator for high density hard disk drives  
Inventors (please provide full names): Kazuo Tsuruta, Masashi Shimizu, Ping Sheng  
Earliest Priority Filing Date: 6/8/2000

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

See attached claims & figs.

A ring-shaped, C-shaped, annular actuator with a radial gap, piezoelectric with concentric electrodes, a fixed end is attached to a base, a free end is attached to a magnetic head slider,

but the structure could be used in another type of device non-disk drive

03-25-03 P12:45 IN

## STAFF USE ONLY

Searcher: Patricia Reynolds  
Searcher Phone #: 306 0755  
Searcher Location: 3C03 P12  
Date Searcher Picked Up: 3-31-03  
Date Completed: 4-1-03  
Searcher Prep & Review Time: 30  
Clerical Prep Time: 80  
Online Time: 80

## Type of Search

NA Sequence (#) \_\_\_\_\_  
AA Sequence (#) \_\_\_\_\_  
Structure (#) \_\_\_\_\_  
Bibliographic ☒ \_\_\_\_\_  
Citation \_\_\_\_\_  
Fulltext \_\_\_\_\_  
Patent Family \_\_\_\_\_  
Other \_\_\_\_\_

## Vendors and cost where applicable

STN \_\_\_\_\_  
Dialog ☒ \_\_\_\_\_  
Questel Orbit \_\_\_\_\_  
Dr Link \_\_\_\_\_  
Lexis Nexis \_\_\_\_\_  
Sequence Systems \_\_\_\_\_  
WWW/Internet ☒ \_\_\_\_\_  
Other (specify) IBM TBS

File 344:Chinese Patents Abs Aug 1985-2003/Jan  
(c) 2003 European Patent Office  
File 347:JAPIO Oct 1976-2002/Nov(Updated 030306)  
(c) 2003 JPO & JAPIO  
File 350:Derwent WPIX 1963-2003/UD,UM &UP=200321  
(c) 2003 Thomson Derwent

? ds

Set	Items	Description
S1	171883	ACTUATOR?
S2	1352	S1 AND (DUAL OR TWO) AND STAGE??
S3	35	ANNULAR? AND (PIEZOELECTRIC OR PIEZO()ELECTRIC) AND CONCEN- TRIC? AND ELECTRODE?
S4	60588	(RING OR C)() (SHAPE? OR CONSTRUCTION OR DESIGN??)
S5	1739	RADIAL()GAP??
S6	581	FIX?()END AND BASE
S7	62268	FREE()END
S8	2956	(ATTACH? OR JOIN? OR MOUNT? OR PLACING OR PLACEMENT) AND M- AGNETIC? AND SLIDER?
S9	4098	HDD OR HIGH()DENSITY()DIS??????()DRIVE??
S10	518844	IC=G11B?
S11	4	S3 AND S4:S8
S12	0	S2 AND S3
S13	19	S2 AND S4:S8
S14	19	S13 NOT S11
S15	0	S14 AND S9
S16	5	S14 AND S10
S17	14	S14 NOT S16

11/3,K/1 (Item 1 from file: 347)  
DIALOG(R)File 347:JAPIO  
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06474581 \*\*Image available\*\*  
ULTRASONIC MOTOR

PUB. NO.: 2000-060156 [JP 2000060156 A]  
PUBLISHED: February 25, 2000 (20000225)  
INVENTOR(s): TSUKUI MICHIO  
KASAI SHU  
KOBAYASHI KOJI  
APPLICANT(s): MITSUBA CORP  
APPL. NO.: 10-228207 [JP 98228207]  
FILED: August 12, 1998 (19980812)

ABSTRACT

...is capable of a plurality of outputs.

SOLUTION: An elastic body 2 pasted with a **piezoelectric** body is provided with an inner **annular** section 4 and an outer **annular** section 5 which are separated in the radial direction by a circumferential groove 2c (2b) and serve for a plurality of **concentrical** resonators. Each of the **ring - shaped** sections is formed with a comb-like tooth section. Independent rotors are made to contact resiliently with the comb-like tooth sections of the **ring - shaped** sections respectively. The **piezoelectric** body is provided with an inner group of **electrodes** and an outer group of **electrodes**, each polarized to the degree set for the resonance frequency of each **ring - shaped** section, and is input with the high frequency voltage of the set degree for driving...

... holes 15 are formed in a bottom wall of the circumferential groove, which separates the **annular** sections and a un polarized section which is a space between each **electrodes** 13a (13b) of the inner **annular** section 4 is provided with a connecting section 6, which connects the inner and the outer **annular** section. Due to this structure, each **annular** section is free to vibrate and the resonators do not interfere with each other because ...

11/3,K/2 (Item 2 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2003 JPO & JAPIO. All rts. reserv.

04394398 \*\*Image available\*\*  
ULTRASONIC WAVE PROBE

PUB. NO.: 06-038298 [JP 6038298 A]  
PUBLISHED: February 10, 1994 (19940210)  
INVENTOR(s): HIRANO TORU  
APPLICANT(s): TOSHIBA CORP [000307] (A Japanese Company or Corporation), JP  
(Japan)  
APPL. NO.: 04-186854 [JP 92186854]  
FILED: July 14, 1992 (19920714)  
JOURNAL: Section: E, Section No. 1550, Vol. 18, No. 263, Pg. 4, May  
19, 1994 (19940519)

JAPIO KEYWORD:R005 ( **PIEZOELECTRIC** FERROELECTRIC SUBSTANCES); R007  
(ULTRASONIC WAVES)

ABSTRACT

PURPOSE: To obtain an **annular** array type ultrasonic wave probe in which the processing accuracy in the connection process is...

...CONSTITUTION: The probe is an **annular** array type ultrasonic wave probe 1b in which twelve-sets of **ring shaped** split **electrodes** E(sub 1)-E(sub 12) whose diameter and width differ from each other are arranged on the surface of a **piezoelectric** material **concentrically** and lands L(sub 1)-L(sub 12) are formed to connect a signal line to one position of each of the split **electrodes** E(sub 1)-E(sub 12). The lands L(sub 2)-L(sub 12) formed on an even number order of the split **electrodes** E(sub 2)-E(sub 12) arranged radially from the center of the probe 1b...

...L(sub 3)-L(sub 11) formed on an odd number order of the split **electrodes** E(sub 3)-E(sub 11) are arranged close to each other along other radial...

11/3,K/3 (Item 1 from file: 350)

DIALOG(R)File 350:Derwent WPIX

(c) 2003 Thomson Derwent. All rts. reserv.

013071509 \*\*Image available\*\*

WPI Acc No: 2000-243381/200021

XRPX Acc No: N00-183488

**Ultrasonic motor comprises internal circumference side and peripheral side of annular ring - shaped structure having electrode groups which are polarized to different degree**

Patent Assignee: MITSUBA DENKI SEISAKUSHO KK (MTSD )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 2000060166	A	20000225	JP 98228205	A	1998081	200021 B

Priority Applications (No Type Date): JP 98228205 A 19980812

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 2000060166	A	5	H02N-002/00	

**Ultrasonic motor comprises internal circumference side and peripheral side of annular ring - shaped structure having electrode groups which are polarized to different degree**

...Abstract (Basic): NOVELTY - Internal circumference side of **annular ring - shaped** resonant structure (4) and peripheral side of **annular ring - shaped** structure (5) of different diameters are **concentrically** arranged on flat surface and are radially divided by grooves (2b). The **electrode** groups of **annular ring - shaped** structures (4,5) are polarized at different level. DETAILED DESCRIPTION - A stator bonds the **annular ring - shaped piezoelectric** portion on **annular ring** like elastic portion. Independent rotors (8,9) are provided for **annular ring** structures (4,5), respectively...

...DRAWING(S) - The figure shows the sectional view of ultrasonic motor.  
(2b) Grooves; (4,5) **Annular ring - shaped** structures; (8,9) Rotors  
...

...NOVELTY - Internal circumference side of **annular ring - shaped** resonant structure (4) and peripheral side of **annular ring - shaped** structure (5) of different diameters are **concentrically** arranged on flat surface and are radially divided by grooves (2b). The **electrode**

groups of **annular ring - shaped** structures (4,5) are polarized at different level. DETAILED DESCRIPTION - A stator bonds the **annular ring - shaped piezoelectric** portion on **annular ring** like elastic portion. Independent rotors (8,9) are provided for **annular ring** structures (4,5), respectively...

...DRAWING(S) - The figure shows the sectional view of ultrasonic motor.  
(2b) Grooves; (4,5) **Annular ring - shaped** structures; (8,9) Rotors

...  
...Title Terms: **ANNULAR** ;

**11/3,K/4** (Item 2 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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007339010

WPI Acc No: 1987-336016/198748

XRPX Acc No: N87-251606

**Direct access storage unit in gigabit order - has disc storage medium attached to end of piezoceramic bender and array of current detector tips**

Patent Assignee: IBM CORP (IBMC )

Inventor: DUERIG U T; GIMZEWSKI J K; POHL W D

Number of Countries: 013 Number of Patents: 008

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 247219	A	19871202	EP 86107188	A	19860527	198748 B
AU 8773257	A	19871203				198804
BR 8702319	A	19880217				198812
US 4831614	A	19890516	US 8725432	A	19870313	198923
ES 2004344	A	19890101	ES 863226	A	19861128	198935
EP 247219	B	19910515				199120
CA 1283733	C	19910430				199122
DE 3679319	G	19910620				199126

Priority Applications (No Type Date): EP 86107188 A 19860527

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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EP 247219	A	E	11		
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Designated States (Regional): CH DE FR GB IT LI NL SE

US 4831614	A		7		
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EP 247219	B				
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Designated States (Regional): CH DE FR GB IT LI NL SE

...Abstract (Basic): Each single transducer provides a tunnel tip (13) at the **free end** of a cantilever beam (12) of silicon dioxide of about 100 microns in length, ten...

...dioxide layer (2) an electrostatic deflection technique is used. For this each beam has an **electrode** (16) connected with a conductor (17)  
...

...A counter **electrode** (18) is formed in the bottom of the cavity. The operating voltage between the **electrodes** is less than twenty volts. and deflection up to 200 nonmetres is achieved with a...

...Abstract (Equivalent): current detector (10,11) characterised in that said storage medium (2) is attached to the **free end** of an elongate, two-dimensional positioning device which is rigidly anchored at its other end, and which comprises at least one **piezoelectric** bender element (3) carrying several pairs of **electrodes** (4,6;5,7) on

orthogonal areas of the surface of said bender element (3), and electronic control circuitry for energising said **electrodes** (4...7) in such a fashion that the **free end** of the bender element (3) performs a circular motion to enable each tunnel tip (13)...

...Abstract (Equivalent): or read through variations of the tunnelling current. The storage medium is attached to the **free end** of a piezoceramic bendable tube. In operation, the **free end** of the tube is moved in a circular orbit by repetitive sequential energisation of oppositely arranged pairs of 90 deg. phase shifted **electrodes**. This tube movement causes each tunnel tip (13) to scan a respective unique associated **annular** area of the storage medium...

...To address a particular **concentric** track in a particular **annular** area, tunnelling current is applied to the associated tip (13) via respective **electrodes**, while concurrently a potential is applied via **electrodes** to tube of a magnitude corresp. to the desired orbital diameter for the tube.

?

16/3,K/1 (Item 1 from file: 347)  
DIALOG(R)File 347:JAPIO  
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06682688 \*\*Image available\*\*

**MAGNETIC DISK DEVICE AND ITS SLIDER MECHANISM**

PUB. NO.: 2000-268517 [JP 2000268517 A]  
PUBLISHED: September 29, 2000 (20000929)  
INVENTOR(s): YOSHIDA MEGUMI  
APPLICANT(s): NEC CORP  
APPL. NO.: 11-068635 [JP 9968635]  
FILED: March 15, 1999 (19990315)

**MAGNETIC DISK DEVICE AND ITS SLIDER MECHANISM**

INTL CLASS: G11B-021/10 ; G11B-005/596 ; G11B-021/02

ABSTRACT

PROBLEM TO BE SOLVED: To obtain a **slider** of a **magnetic** disk device capable of suppressing the fluctuation of an actuation in the perpendicular direction of the **magnetic** disk detrimental to the recording and reproducing characteristics generated when a microactuator of a **magnetic** head element drive type designed to expand a **magnetic** head positioning control band by increasing the resonance frequency of a **magnetic** head drive system is used.

SOLUTION: The **slider** is formed of a **two - stage slider** structure consisting of a main **slider** 1 having a relative high flying height and a secondary **slider** 2 of a low flying type and microminiature size mounted with a **magnetic** head element. Only the secondary **slider** 2 is microdriven in the radial direction of the **magnetic** disk by the microactuator structure. As a result, the fluctuation in the **magnetic** disk perpendicular direction of the **actuator** detrimental to the recording and reproducing characteristics generated when the microactuator of the **magnetic** head element drive type is driven in order for the structure body (i.e., the secondary **slider** ) including the **magnetic** head element part which is the object to be driven of the microactuator to itself form a control system for spacing between the **magnetic** head and a method disk medium can be suppressed.

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16/3,K/2 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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014385133 \*\*Image available\*\*

WPI Acc No: 2002-205836/200226

XRPX Acc No: N02-156786

**Dual stage piezoelectric actuator for high density hard disk drives to obtain high bandwidth head positioning servo system**

Patent Assignee: XINKE IND CO LTD (XINK-N); KASAJIMA T (KASA-I); SHANG P (SHAN-I); SHIRAISHI M (SHIR-I); WU K (WUKK-I); SAE MAGNETICS HK LTD (SAEM-N)

Inventor: KASAJIMA T; SHANG P; SHIRAISHI M; WU K; WANG Z

Number of Countries: 002 Number of Patents: 003

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
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WO 200195329	A1	20011213	WO 2000CN148	A	20000608	200226	B
US 20010055182	A1	20011227	US 2001811112	A	20010316	200226	
CN 1378690	A	20021106	CN 2000809524	A	20000608	200316	
			WO 2000CN148	A	20000608		

Priority Applications (No Type Date): WO 2000CN148 A 20000608

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200195329 A1 E 28 G11B-021/21

Designated States (National): CN

US 20010055182 A1 G11B-005/56

CN 1378690 A G11B-021/21

Dual stage **piezoelectric** actuator for high density hard disk drives  
to obtain high bandwidth head positioning servo system

Abstract (Basic):

... Includes an annular piezoelectric element and a **base** , with a gap along its radial direction. The **fixed end** of the annular element, is connected to the **base** , while the other end is free. The **base** is made of piezoelectric materials.

... The annular element is divided into **two** annular parts along its circumference by the electrode patterns applied on its **two** opposite surfaces. When driving voltages are applied; the **actuator** can generate roughly a rotary motion around the center of the annular piezoelectric element. An...

Title Terms: **DUAL** ;

International Patent Class (Main): **G11B-005/56** ...

... **G11B-021/21**

International Patent Class (Additional): **G11B-005/58** ...

... **G11B-005/60** ...

... **G11B-021/20** ...

... **G11B-021/24**

**16/3,K/3 (Item 2 from file: 350)**

DIALOG(R)File 350:Derwent WPIX

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013479822 \*\*Image available\*\*

WPI Acc No: 2000-651765/200063

XRPX Acc No: N00-483444

Slider **mechanism** for magnetic disk unit has micro actuator that **radially drives main** slider , which has relatively high amount of **levitation**, and **secondary** slider , which has low amount of levitation

Patent Assignee: NEC CORP (NIDE )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 2000268517	A	20000929	JP 9968635	A	19990315	200063 B

Priority Applications (No Type Date): JP 9968635 A 19990315

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

JP 2000268517 A 7 G11B-021/10

Slider **mechanism** for magnetic disk unit has micro actuator that **radially drives main** slider , which has relatively high amount of

levitation, and secondary slider , which has low amount of levitation

Abstract (Basic):

... A main **slider** (1) with a relatively high amount of levitation and a secondary **slider** (2) with a low amount of levitation form a **two - stage** structure on a suspension (7). The secondary **slider** is supported by the tray ring edge of the main **slider** . A **magnetic** head element (6) is **mounted** on the **two - stage** structure. A micro **actuator** radially drives both **sliders** .

... An INDEPENDENT CLAIM is also included for a **magnetic** disk unit  
...

...For **magnetic** disk unit...

...Suppresses fluctuation of micro **actuator** perpendicular to **magnetic** disk which may be harmful to recording and reproducing characteristic and which is caused when resonance frequency of **magnetic** head drive system is made high...

...The figure is the schematic perspective diagram showing the components of a **two - stage slider** of a micro **actuator** unit...

...Main **slider** (1...

...Secondary **slider** (2...

... **Magnetic** head element (6

...Title Terms: **MAGNETIC** ;

International Patent Class (Main): **G11B-021/10**

International Patent Class (Additional): **G11B-005/596** ...

... **G11B-021/02**

**16/3,K/4** (Item 3 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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011343470 \*\*Image available\*\*

WPI Acc No: 1997-321375/199730

XRFX Acc No: N97-265889

Dual **drive head actuator** - includes load carrier for supporting  
**slider on front end section, with slider carrying drive head**

Patent Assignee: FUJITSU LTD (FUIT )

Inventor: KOGANEZAWA S; MIZOSHITA Y

Number of Countries: 004 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 19643863	A1	19970605	DE 1043863	A	19961030	199730 B
JP 9161425	A	19970620	JP 95315671	A	19951204	199735
US 5781381	A	19980714	US 96728079	A	19961009	199835
KR 97050733	A	19970729	KR 9661499	A	19961204	199909
KR 236608	B1	20000115	KR 9661499	A	19961204	200114
DE 19643863	C2	20020321	DE 1043863	A	19961030	200222
JP 3333367	B2	20021015	JP 95315671	A	19951204	200275

Priority Applications (No Type Date): JP 95315671 A 19951204

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

DE 19643863 A1 43 G11B-005/596

JP 9161425 A 16 G11B-021/10

US 5781381 A G11B-005/55  
KR 97050733 A G11B-019/02  
KR 236608 B1 G11B-019/02  
DE 19643863 C2 G11B-005/55  
JP 3333367 B2 16 G11B-021/10 Previous Publ. patent JP 9161425  
Dual drive head actuator - ...

...includes load carrier for supporting slider on front end section, with slider carrying drive head

...Abstract (Basic): A magnetic disc drive head actuator device has a base with an actuator arm rotatably mounted on the base, a first drive device for rotating the actuating arm, and a load carrier for supporting a slider on its front end-section. The slider carrying a head...

...USE - Double drive or two stage head actuation in magnetic disc drive, for computer storage device...

Title Terms: DUAL ;

International Patent Class (Main): G11B-005/55 ...

... G11B-005/596 ...

... G11B-019/02 ...

... G11B-021/10

International Patent Class (Additional): G11B-021/02

16/3,K/5 (Item 4 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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007217808

WPI Acc No: 1987-214816/198731

XRPX Acc No: N87-160616

Automatic video tape winder for cassette spools - is supplied with pair of spools by cylinder contg. two pistons

Patent Assignee: AGFA-GEVAERT AG (GEVA ); BASF MAGNETICS GMBH (BADI )

Inventor: LUTZ G; TORAL J

Number of Countries: 008 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 3624305	C	19870806	DE 3624305	A	19860718	198731 B
EP 253311	A	19880120	EP 87109920	A	19870709	198803
US 4811911	A	19890314	US 8773002	A	19870713	198913
EP 253311	B1	19920520	EP 87109920	A	19870709	199221
DE 3779198	G	19920625	DE 3779198	A	19870709	199227
			EP 87109920	A	19870709	

Priority Applications (No Type Date): DE 3624305 A 19860718

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

DE 3624305 C 7

EP 253311 A E

Designated States (Regional): CH DE FR GB IT LI NL

US 4811911 A 7

EP 253311 B1 G 9 G11B-023/113

Designated States (Regional): CH DE FR GB IT LI NL

DE 3779198 G G11B-023/113 Based on patent EP 253311

... is supplied with pair of spools by cylinder contg. two pistons

...Abstract (Basic): are handled in pairs by a gripper unit mounted at the end of a linear **actuator** (5) and possessing a pair of spool guide elements (14...

...Abstract (Equivalent): reels, removably fitted in a receptacle (2), to a winding apparatus with the aid of **two** holding elements (11, 11') gripping the reels, and with the aid of a pivoting arm (7) as well as further transfer elements (14), the winding apparatus comprising **two** spindles (15, 15') on which the reels (3, 3') can be removably fastened, and the...

...which the reels are delivered by the winding apparatus, wherein the transporting device includes a **two - stage** operable cylinder (5), the pistons (5a, 5b) of which operate via a point of application (6) a swivelling arm (7), at the **free end** (10) of which there is perpendicular to the swivelling arm (7) a further pivotably mounted...

...element (11) being chosen in such a way that the minimum distance A between the **two** holding elements (11, 11') is equal to the spacing of the pair of reels in...

...the maximum distance B between the holding elements is equal to the distance between the **two** spindles (15, 15') of the winding apparatus.

...Abstract (Equivalent): a pair of spools to the winder. The delivery device comprises a movable cylinder containing **two** pistons, which cylinder acts on a swivel arm, the **free end** of which arm carries a rotatably mounted arm. The arm has a pair of holders...

...Title Terms: **TWO** ;

International Patent Class (Main): **G11B-023/113**

...International Patent Class (Additional): **G11B-023/11**

?

17/3,K/1 (Item 1 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2003 JPO & JAPIO. All rts. reserv.

05018429 \*\*Image available\*\*  
FINE ADJUSTMENT AND SCANNING PROBE MICROSCOPE

PUB. NO.: 07-311029 [JP 7311029 A]  
PUBLISHED: November 28, 1995 (19951128)  
INVENTOR(s): HOSHINO YOSHIHIRO  
APPLICANT(s): HITACHI CONSTR MACH CO LTD [351479] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 06-105273 [JP 94105273]  
FILED: May 19, 1994 (19940519)

#### ABSTRACT

... To provide a distortion-free microscopic image by precisely determining moving coordinates, relating to an **actuator** including a fine-adjustment detection system and a scanning probe microscope using the **actuator** .

...

...CONSTITUTION: An **actuator** comprises a tube piezoelectric element 1 fixed at one end, **two** converging beams emitted in the directions of X- and Y-axes from within an optical path block 2 secured to the **free end** of the tube piezoelectric element 1, and **two** condensing convex lenses 5a, 5b fitted into the apertures of the optical path block 2...

... adjusts the receivers 6a, 6b on their respective optical axes. When a probe or a **stage** is secured at the lower end of the optical path block 2, the system can

17/3,K/2 (Item 2 from file: 347)  
DIALOG(R)File 347:JAPIO  
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03358015 \*\*Image available\*\*  
ABNORMAL HEAT GENERATION DETECTING METHOD IN CONDUCTIVE PART

PUB. NO.: 03-020915 [JP 3020915 A]  
PUBLISHED: January 29, 1991 (19910129)  
INVENTOR(s): SENBA KATSUAKI  
APPLICANT(s): MEIDENSHA CORP [000610] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 01-154130 [JP 89154130]  
FILED: June 16, 1989 (19890616)  
JOURNAL: Section: E, Section No. 1054, Vol. 15, No. 143, Pg. 82, April 11, 1991 (19910411)

#### ABSTRACT

PURPOSE: To find out abnormal heat generation at an early **stage** by taking out electric current flowing in each contact part as an output voltage of a search coil, separating each output voltage into **two** groups and connecting them in the way so that voltage difference is offset mutually, applying their output to a biomorph- **actuator** , and detecting the displacement by an optical fiber displacement meter...  
... owing to the voltage difference corresponding to the current imbalance is applied to a bimorph- **actuator** 1. By this, an **actuator** 1 swings and

displaces its **free end** . Then, light is radiated through an optical fiber 1 to the **free end** part of the **actuator** 1, reflected light through the optical fiber is received by a light emitting-receiving part...

17/3,K/3 (Item 3 from file: 347)  
DIALOG(R)File 347:JAPIO  
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01413682 \*\*Image available\*\*  
MOUNTING DEVICE FOR SPOT WELDING GUN IN WELDING ROBOT

PUB. NO.: 59-125282 [JP 59125282 A]  
PUBLISHED: July 19, 1984 (19840719)  
INVENTOR(s): INUTAKE TATSUTOSHI  
MATSUMOTO HIDEYUKI  
YAMASHITA EIICHI  
APPLICANT(s): NISSAN MOTOR CO LTD [000399] (A Japanese Company or Corporation), JP (Japan)  
OHARA KINZOKU KOGYO KK [365133] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 57-232968 [JP 82232968]  
FILED: December 28, 1982 (19821228)  
JOURNAL: Section: M, Section No. 338, Vol. 08, No. 249, Pg. 86,  
November 15, 1984 (19841115)

#### ABSTRACT

PURPOSE: To attach and detach easily exchangeably **two** spot welding guns to and from a welding robot by attaching a bracket to the arm of the welding robot, and providing mount strikers to the **two** spot welding guns ...

... installed to the arm of one welding robot and mount strikers 16 are attached to **two** spot welding guns 2, 3. The **two** guns 2, 3 are positioned preliminarily on stands 4, 5, respectively. The bracket 11 at the tip of the arm moves downward an **actuator** 14 to disengage a lock pin from the striker 16 in the **stage** of exchanging the gun 3 to the arm of the welding robot attached with the...

... removed bracket is turned 180 deg. and is inserted onto the striker 16 of the **C - shaped** spot welding gun 3, whereby the exchange of the spot welding gun at the tip...

17/3,K/4 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2003 Thomson Derwent. All rts. reserv.

010792267 \*\*Image available\*\*  
WPI Acc No: 1996-289220/199630  
XRPX Acc No: N96-242710

Vibration actuator utilising degeneracy between extensional and bending vibration, e.g. for driving AF lens in camera - has moving member contacting elastic member joined to piezoelectric elements, driving signal generates vibration in parallel direction to reference plane, and vibration in perpendicular direction

Patent Assignee: NIKON CORP (NIKR )  
Inventor: TOMIKAWA Y  
Number of Countries: 005 Number of Patents: 005  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 718899	A2	19960626	EP 95309345	A	19951221	199630 B
JP 8182351	A	19960712	JP 94318150	A	19941221	199638
JP 8331874	A	19961213	JP 95134895	A	19950601	199709
EP 718899	A3	19971229	EP 95309345	A	19951221	199818
US 6072266	A	20000606	US 95574928	A	19951219	200033

Priority Applications (No Type Date): JP 95134895 A 19950601; JP 94318150 A 19941221

#### Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing	Notes
EP 718899	A2	E	40	H01L-041/09		
Designated States (Regional): DE FR GB						
JP 8182351	A		11	H02N-002/00		
JP 8331874	A		9	H02N-002/00		
EP 718899	A3			H01L-041/09		
US 6072266	A			H01L-041/08		

**Vibration actuator utilising degeneracy between extensional and bending vibration, e.g. for driving AF lens in camera...**

...Abstract (Basic): The vibration **actuator** includes a **ring shaped** elastic member (11) joined to electromechanical converting elements, piezoelectric elements, (21 and 22). A relative...

...signal, a first vibration vibrating in a direction parallel to a reference plane where the **ring shape** is formed...

...the reference plane. The moving member moves relative to the elastic member in one or **two** dimensional directions in the reference plane with the **two** vibrations...

...USE/ADVANTAGE - For use in X-Y **stage** of microscope, feeder of plotter sheets or for driving blur correction lens in **two** directions. Allows either one or **two** dimensional movement in plane, and can be easily assembled in cylindrical mechanism, such as lens...

...Title Terms: **STAGE** ;

17/3,K/5 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009755043 \*\*Image available\*\*

WPI Acc No: 1994-034894/199404

XRPX Acc No: N94-027186

**Multi-purpose aircraft for transporting heavy loads - has ring - shaped fuselage powered by series of motors situated round it, equipped with steerable rotor units.**

Patent Assignee: DEMIDOV G V (DEMI-I); OSIPOV E S (OSIP-I)

Inventor: DEMIDOV G V; OSIPOV E S

Number of Countries: 021 Number of Patents: 009

#### Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9401326	A1	19940120	WO 93RU161	A	19930708	199404 B
AU 9345930	A	19940131	AU 9345930	A	19930708	199422
EP 601212	A1	19940615	EP 93916330	A	19930708	199423
			WO 93RU161	A	19930708	
JP 7502233	W	19950309	WO 93RU161	A	19930708	199518
			JP 94503205	A	19930708	

EP 601212	A4	19941130	EP 93916330	A	19930000	199541
AU 674691	B	19970109	AU 9345930	A	19930708	199710
US 5595358	A	19970121	WO 93RU161	A	19930708	199710
			US 94204328	A	19940810	
			US 96593019	A	19960129	
RU 2064085	C1	19960720	RU 9425912	A	19940712	199713
RU 2070143	C1	19961210	SU 5051337	A	19920708	199730

Priority Applications (No Type Date): RU 9212649 A 19921216; SU 5051337 A 19920708

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 9401326	A1	R	31	B64C-039/06	
Designated States (National): AU CA JP US					
Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE					
AU 9345930	A			B64C-039/06	Based on patent WO 9401326
EP 601212	A1	E	15	B64C-039/06	Based on patent WO 9401326
Designated States (Regional): DE ES FR GB IT SE					
JP 7502233	W		8	B64C-029/00	Based on patent WO 9401326
AU 674691	B			B64C-039/06	Previous Publ. patent AU 9345930
					Based on patent WO 9401326
US 5595358	A		13	B64C-027/08	Cont of application WO 93RU161
					Cont of application US 94204328
RU 2064085	C1		9	F03D-011/00	
RU 2070143	C1		10	B64C-039/06	
EP 601212	A4			B64C-039/06	

... has ring - shaped fuselage powered by series of motors situated round it, equipped with steerable rotor units.

...Abstract (Basic): The aircraft has a fuselage in two curved sections which are connected to form a ring (1) and is powered by a...

...inside its fuselage or suspended from it, forming a platform for the re-usable booster stage of a spacecraft; it could also be used in agriculture, e.g. for aerosol irrigation...

...Abstract (Equivalent): member, said vehicle also having rotor units with blades and also provided with a control actuator for the blades, the rotor units having nozzles arranged along the axis of rotation at...

17/3,K/6 (Item 3 from file: 350)  
 DIALOG(R)File 350:Derwent WPIX  
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008778835 \*\*Image available\*\*  
 WPI Acc No: 1991-282852/199139  
 XRPX Acc No: N91-216330

Semiconductor laser module with light-guide - has laser coupled optimally by imaging lens centred and fixed in unitary metallic housing

Patent Assignee: ALCATEL SEL AG (COGE ); ALCATEL NV (COGE ); STANDARD ELEKTRIK LORENZ AG (INTT )

Inventor: KAISER M

Number of Countries: 013 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 447768	A	19910925	EP 91101251	A	19910131	199139 B
DE 4009380	A	19910926	DE 4009380	A	19900323	199140
JP 4223388	A	19920813	JP 9182971	A	19910325	199239
US 5191629	A	19930302	US 91672891	A	19910321	199311



EP 447768	B1	19950426	EP 91101251	A	19910131	199521
DE 59105288	G	19950601	DE 505288	A	19910131	199527
			EP 91101251	A	19910131	
ES 2074176	T3	19950901	EP 91101251	A	19910131	199541

Priority Applications (No Type Date): DE 4009380 A 19900323

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 447768	A				
Designated States (Regional): AT BE CH DE ES FR GB IT LI NL SE					
JP 4223388	A		4	H01S-003/18	
US 5191629	A		5	G02B-006/42	
EP 447768	B1 G		8	G02B-006/42	
Designated States (Regional): AT BE CH DE ES FR GB IT LI NL SE					
DE 59105288	G			G02B-006/42	Based on patent EP 447768
ES 2074176	T3			G02B-006/42	Based on patent EP 447768

...Abstract (Basic): adjust the position of the laser (6) w.r.t. the median axis of the **two** bores (5, 4) contg. the fibre (10) and the lens (9...  
 ...Abstract (Equivalent): in the centre bore (4), characterised in that the recess (3) is offset outwardly in **stages** to a diameter greater than the flange diameter of the laser casing (6) and forms a **ring - shaped** stop face (3a) for the flange (6a), that there are in the module casing (1) three **actuators** acting on the flange (6a) of the laser casing (6) in a triangle, and that...  
 ...Abstract (Equivalent): laser in alignment with the central axis of the housing. The device also has three **actuators** arranged radially at approximately 120 degrees from each other with each directed toward the central...

17/3,K/7 (Item 4 from file: 350)  
 DIALOG(R)File 350:Derwent WPIX  
 (c) 2003 Thomson Derwent. All rts. reserv.

007624766 \*\*Image available\*\*  
 WPI Acc No: 1988-258698/198837  
 XRPX Acc No: N88-196374

**EM relay angled yoke and flat armature - comprises simple subassemblies enabling automatic assembly**

Patent Assignee: SIEMENS AG (SIEI )

Inventor: DITTMANN M

Number of Countries: 006 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 281950	A	19880914	EP 88103312	A	19880303	198837 B
JP 63248029	A	19881014	JP 8858556	A	19880314	198847
US 4837538	A	19890606	US 88244609	A	19880909	198928
EP 281950	B1	19920805	EP 88103312	A	19880303	199232
DE 3873380	G	19920910	DE 3873380	A	19880303	199238
			EP 88103312	A	19880303	

Priority Applications (No Type Date): DE 3708286 A 19870313

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 281950	A G		11		
Designated States (Regional): DE FR GB IT					
US 4837538	A		9		
EP 281950	B1 G		12	H01H-050/04	
Designated States (Regional): DE FR GB IT					
DE 3873380	G			H01H-050/04	Based on patent EP 281950

...Abstract (Basic): A subassembly (7) provides the e.m. **actuator stage** causing an armature plate (9) to move. The armature is mounted on a separate sub...

...Abstract (Equivalent): axis adjacent to the winding, having a flat armature (9) which is supported on the **free end** of the second yoke limb (7b) and, with the free core end, forms a working...

...32, 22, 23) for the terminal element (8d) of the leaf spring (10) and for **two** stationary contact elements (24, 27, 28; 31), characterised in that a separately produced connecting angle...

...Abstract (Equivalent): having flanges and an angular yoke and a flat armature seated in front of a **free end** of the yoke. A terminal angle is secured to a leg of the yoke and...

17/3,K/8 (Item 5 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007624068 \*\*Image available\*\*

WPI Acc No: 1988-258000/198837

XRPX Acc No: N88-195834

**Heating current switching relay for washing machine - has single coil serving two flux circuits with two armatures**

Patent Assignee: HENGSTLER BAUELEMENTE (HENG-N)

Inventor: SEEGER G A

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 3705918	A	19880908	DE 3705918	A	19870225	198837 B
DE 3705918	C	19900531				199022

Priority Applications (No Type Date): DE 3705918 A 19870225

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
DE 3705918	A		4		

... **has single coil serving two flux circuits with two armatures**

...Abstract (Basic): The relay has its electromagnetic drive consisting of **two** independent armatures (2,3) and a U- or C - **shaped** magnet arrangement (1) with first limb (4) forming a pivot for the **two** armatures and second limb divided into **two** parts (5,6). A single excitation coil (7) serves both armatures and acts via the **two** parts on **two** separate flux circuits one for each armature...

...Abstract (Equivalent): of the type used to control the heating circuit of a washing machine has an **actuator** with a 'U' or 'C' shaped magnetic **stage** (1) that has a coil (7) and a pair of armatures (2,3). The armatures are mechanically separate and are of the pivotted plate type, supported on the core. **Actuator** bars (8,9) are moved by the armature plates to operate the contacts...

...The arrangement provides **two** separate magnetic circuits such that if one contact pair fails by contact welding the other...

...Title Terms: **TWO** ;

17/3,K/9 (Item 6 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007323693

WPI Acc No: 1987-320700/198745

XRPX Acc No: N87-239932

**Snap dome switch keyboard assembly reducing contact bounce time - has dual contact switch sites with piggy-back snap domes, each button actuators**

Patent Assignee: KB DENVER INC (KBDE-N)

Inventor: DUNLAP B D

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4703139	A	19871027	US 86874895	A	19860620	198745 B

Priority Applications (No Type Date): US 83529265 A 19830906; US 86874895 A 19860620

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4703139	A	6		

... has dual contact switch sites with piggy-back snap domes, each button actuators

...Abstract (Basic): at least one switch site on one of the surfaces. The site includes an outer **ring shaped** contact and **two** inner contacts providing **dual** channel circuit operation. An electrically conductive snap dome switch coacts with the switch site for...

...the contacts open and for selectively closing the contacts when in a depressed and flattened **stage** .  
...

...includes a single individual dome switch having a peripheral edge in continuous engagement with the **ring shaped** contact and a central portion in registry with the inner contacts and in engagement when...

...contacts. The snap dome is retained in registry with the switch site and a button **actuator** has a post in alignment with the snap dome switch. A bezel unit retains the button **actuator** in working relation with the board

...Title Terms: **DUAL** ;

17/3,K/10 (Item 7 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007116936

WPI Acc No: 1987-116933/198717

XRPX Acc No: N87-087604

**Key operated rotary switch - has multistage stage switch operated by cylinder lock unit**

Patent Assignee: MULLER H (MULL-I); MUELLER H (MUEL-I)

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 3537252	A	19870423	DE 3537252	A	19851019	198717 B
DE 3537252	C2	19950223	DE 3537252	A	19851019	199512

Priority Applications (No Type Date): DE 3537252 A 19851019

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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DE 3537252	A		4		
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DE 3537252	C2		4	H01H-027/06	
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... has multistage stage switch operated by cylinder lock unit

...Abstract (Basic): switch (3) is mounted. Coupled to the shaft (4) of the switch is a rotary **stage** (5) of plastics material. Markings on the rotary **stage** are visible through the housing side wall to indicate the switch position...

...Located beneath the switching **stage** is a profile cylinder lock (11) that turns around an axis (9). Projecting from the cylinder is an **actuator** arm (13) moved by key rotation to engage pins (14) projecting from the rotary **stage**.

...Abstract (Equivalent): 14) rotating about a circle (15) which intersects with the circle (16) described by the **free end** of the barrel bolt (13). The projections (14) are arranged such that in each switch position, one projection (14) lies in the area of intersection of the **two** circles (15,16...

...Title Terms: **STAGE** ;

17/3,K/11 (Item 8 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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004475631

WPI Acc No: 1985-302509/198548

XRPX Acc No: N85-225305

**Vehicle bonnet opening mechanism - has interconnected gripper floating arms mounted for rotary movement between parked, pick-up and full open positions**

Patent Assignee: GMFANUC ROBOTICS CO (GMFA-N)

Inventor: CUMMINS M A; POWELL T M

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4552506	A	19851112				198548 B

Priority Applications (No Type Date): US 84573430 A 19840124

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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US 4552506	A		14		
------------	---	--	----	--	--

...Abstract (Basic): utilised as a member of a four-bar linkage. An arm control linkage provides a **two - stage** harmonic motion including smooth acceleration and deceleration of the closure after a gripper mechanism mounted on the **free end** of the gripper arm has received the closure at the pick-up position. A fixture...

...A solenoid valve controls a rotary **actuator** of the opener mechanism Magnetic proximity switches provide status signals to a programmable controller of...

17/3,K/12 (Item 9 from file: 350)

DIALOG(R)File 350:Derwent WPIX  
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003989689

WPI Acc No: 1984-135233/198422

XRPX Acc No: N84-100231

**Fast response electromagnetically activated matrix printer - has multiple print wires with actuators formed by pivoted armature elements each with solenoid stages**

Patent Assignee: TOKYO ELECTRIC CO LTD (TODK )

Inventor: KOMAKINE S T; OCHIAI K M

Number of Countries: 003 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 3340596	A	19840524	DE 3340596	A	19831110	198422 B
JP 59091069	A	19840525	JP 82201430	A	19821116	198427
JP 59114068	A	19840630	JP 82223405	A	19821220	198432
US 4537520	A	19850827	US 83552066	A	19831115	198537
DE 3340596	C	19870527				198721

Priority Applications (No Type Date): JP 8314219 A 19830131; JP 82201430 A 19821116; JP 82223405 A 19821220

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
DE 3340596	A		23		

... has multiple print wires with actuators formed by pivoted armature elements each with solenoid stages

...Abstract (Basic): 23) at one end and accurately guided by a bush at the other (36). The **actuator** assembly has a **ring - shaped** yoke (20) on which are located a number of core elements (25...

...Abstract (Equivalent): The armature also has at least **two** curved surfaces which fit in matching curved recesses in the body of the head with...

...Title Terms: **STAGE**

17/3,K/13 (Item 10 from file: 350)

DIALOG(R)File 350:Derwent WPIX  
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003904482

WPI Acc No: 1984-050027/198409

XRPX Acc No: N84-037781

**EM switch for reversible motor - has spring between each pair of bridging contacts and intermediate section with two end contacts**

Patent Assignee: MATSUSHITA ELECTRIC WORKS LTD (MATW ); SDS-ELEKTRO GMBH (SDSE-N)

Inventor: DIETRICH B

Number of Countries: 003 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 3230562	A	19840223	DE 3230562	A	19820817	198409 B
JP 59063634	A	19840411	JP 83150888	A	19830816	198421
DE 3230562	C	19861218				198651
CH 661378	A	19870715				198733

Priority Applications (No Type Date): DE 3230562 A 19820817

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes  
DE 3230562 A 18

... has spring between each pair of bridging contacts and intermediate section with two end contacts

...Abstract (Basic): The **slider** carrying pairs of bridging contacts is connected to the armature of a **magnetic** drive with **two** windings **mounted** end to end along the armature. These move the armature into **two** end positions or an intermediate position. Between each pair of contacts is a spring, and each side of each pair is one of **two** fixed contacts. Between the first **two** positions and a further position is an empty position containing a fixed element at one...

...In one end position of the **slider**, this fixed element has a contact which is connected to one of the contacts of the first **two** pairs. In the other end position, a second contact is connected to one of the...

...Abstract (Equivalent): 3,4, and 5,6) of contacts. Changeover of contacts is provided by a single **actuator** (12) moved by an electro-mechanical stage .

...

...ADVANTAGE - Eliminates need for separate interlock **stages** . (9pp)

...Title Terms: **TWO** ;

17/3,K/14 (Item 11 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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001263239

WPI Acc No: 1975-E7056W/197518

**Slewing crane on vertical column - has multi-section jib controlled by lever on free end**

Patent Assignee: LIEBHERR-AERO-TECH (LIEB-N)  
Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 2353137	A	19750424				197518 B
DE 2353137	B	19810129				198106

Priority Applications (No Type Date): DE 2353137 A 19731023

... has multi-section jib controlled by lever on free end

...Abstract (Basic): in several sections and follows the operator's movements, having a control lever on the **free end** . A pushbutton can be provided on the lever, to convert the jib into the manoeuvrable condition, also a load hook on the **free end** . The jib can be in **two** sections, both pivoting about horizontal axes under the action of rams supplied from an electro-hydraulic systems, and controlled by servo valves. The solenoid **actuators** for the first **stage** of the servo valves can be connected electrically to a common cruciform potentiometer, actuated by...

?

File 2:INSPEC 1969-2003/Mar W4  
(c) 2003 Institution of Electrical Engineers  
File 6:NTIS 1964-2003/Mar W5  
(c) 2003 NTIS, Intl Cpyrgh All Rights Res  
File 8:Ei Compendex(R) 1970-2003/Mar W4  
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File 34:SciSearch(R) Cited Ref Sci 1990-2003/Mar W4  
(c) 2003 Inst for Sci Info  
File 35:Dissertation Abs Online 1861-2003/Feb  
(c) 2003 ProQuest Info&Learning  
File 65:Inside Conferences 1993-2003/Mar W4  
(c) 2003 BLDSC all rts. reserv.  
File 94:JICST-EPlus 1985-2003/Mar W5  
(c) 2003 Japan Science and Tech Corp(JST)  
File 95:TEME-Technology & Management 1989-2003/Mar W2  
(c) 2003 FIZ TECHNIK  
File 99:Wilson Appl. Sci & Tech Abs 1983-2003/Feb  
(c) 2003 The HW Wilson Co.  
File 144:Pascal 1973-2003/Mar W4  
(c) 2003 INIST/CNRS  
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec  
(c) 1998 Inst for Sci Info  
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13  
(c) 2002 The Gale Group  
File 603:Newspaper Abstracts 1984-1988  
(c) 2001 ProQuest Info&Learning  
File 483:Newspaper Abs Daily 1986-2003/Mar 29  
(c) 2003 ProQuest Info&Learning

? ds

Set	Items	Description
S1	110102	ACTUATOR?
S2	1400	S1 AND (DUAL OR TWO) AND STAGE??
S3	3	ANNULAR? AND (PIEZOELECTRIC OR PIEZO()ELECTRIC) AND CONCEN- TRIC? AND ELECTRODE?
S4	9906	(RING OR C)() (SHAPE? OR CONSTRUCTION OR DESIGN??)
S5	368	RADIAL()GAP??
S6	42	FIX?()END AND BASE
S7	4043	FREE()END
S8	226	(ATTACH? OR JOIN? OR MOUNT? OR PLACING OR PLACEMENT) AND M- AGNETIC? AND SLIDER?
S9	2503	HDD OR HIGH()DENSITY()DIS?????()DRIVE??
S10	10093	AU=(SHANG, P? OR WU, K? OR KASAJIMA, T? OR SHIRAISHI, M? - OR SHANG P? OR WU K? OR KASAJIMA T? OR SHIRAISHI M?)
S11	3	RD S3 (unique items)
S12	0	S2 AND S4 AND S5 AND S6 AND S7
S13	0	S2 AND S4
S14	0	S4 AND S5 AND S6 AND S7
S15	11	S8 AND S9
S16	0	S15 AND S4
S17	11	S15 NOT S11
S18	8	RD S17 (unique items)
S19	2	S2 AND S10
S20	2	RD S19 (unique items)
S21	10	S2 AND S4:S8
S22	7	S21 NOT (S3 OR S15 OR S19)
S23	5	RD S22 (unique items)

11/3,K/1 (Item 1 from file: 2)

DIALOG(R)File 2:INSPEC

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02327030 INSPEC Abstract Number: A84097232, B84056363

**Title: Planar annular surface wave transducer (for acoustic microscopy)**

Author(s): Vogel, R.; Pollari, G.

Author Affiliation: Coll. of Engng., Univ. of Iowa, Iowa City, IA, USA

Conference Title: 1983 Ultrasonics Symposium Proceedings p.760-5 vol.2

Editor(s): McAvoy, B.R.

Publisher: IEEE, New York, NY, USA

Publication Date: 1983 Country of Publication: USA 2 vol. 1180 pp.

U.S. Copyright Clearance Center Code: 0090-5607/83/0000-0760\$01.00

Conference Sponsor: IEEE

Conference Date: 31 Oct.-2 Nov. 1983 Conference Location: Atlanta, GA, USA

Language: English

Subfile: A B

**Title: Planar annular surface wave transducer (for acoustic microscopy)**

Abstract: An **annular** surface wave transducer is a device where ingoing and outgoing radial surface waves, launched from **concentric** circular **electrodes** on the surface of a **piezoelectric** material, radiate acoustic energy into a liquid. The device has been used as a transducer...

... surface with a laser imaging system are given, and finally, the receiving characteristics of the **annular** surface wave transducer are compared with those of a typical thickness transducer.

Identifiers: **annular** surface wave transducer...

... **concentric** circular **electrodes** ;

11/3,K/2 (Item 2 from file: 2)

DIALOG(R)File 2:INSPEC

(c) 2003 Institution of Electrical Engineers. All rts. reserv.

02019797 INSPEC Abstract Number: A83029678, B83021381

**Title: The development of improved ultrasound heaters suitable for superficial tissue heating**

Author(s): Munro, P.; Hill, R.P.; Hunt, J.W.

Author Affiliation: Dept. of Medical Biophys., Univ. of Toronto, Toronto, Ont., Canada

Journal: Medical Physics vol.9, no.6 p.888-97

Publication Date: Nov.-Dec. 1982 Country of Publication: USA

CODEN: MPHYA6 ISSN: 0094-2405

U.S. Copyright Clearance Center Code: 0094-2405/82/060888-10\$01.20

Language: English

Subfile: A B

...Abstract: to be the most practical device for routine use. The method employed to mount the **piezoelectric** crystal in the heater was found to have a profound effect on the acoustical field...

...be further improved by rapidly sweeping the frequency of the signal used to excite the **piezoelectric** crystal. A heater in which the rear **electrode** of the **piezoelectric** crystal is sectioned into a series of **concentric** rings has also been developed. This heater can deposit more acoustical energy at the edges...

...Identifiers: **annular** array transducers...



... piezoelectric crystal

11/3,K/3 (Item 3 from file: 2)

DIALOG(R) File 2:INSPEC

(c) 2003 Institution of Electrical Engineers. All rts. reserv.

00367565 INSPEC Abstract Number: A72022626

**Title:** Study on the disturbances of a piezoelectric disc with concentric electrodes

**Author(s):** Mukherjee, G.P.

**Author Affiliation:** Hindu School, Calcutta, India

**Journal:** Czechoslovak Journal of Physics, Section B vol.22, no.3 p. 177-8

**Publication Date:** 1972 **Country of Publication:** Czechoslovakia

**CODEN:** CZYPAO **ISSN:** 0011-4626

**Language:** English

**Subfile:** A

**Title:** Study on the disturbances of a piezoelectric disc with concentric electrodes

**Abstract:** The radial displacement of an annular piezoelectric ceramic disc with concentric electrodes has been found with the help of transform calculus when the external periphery is subjected...

...Descriptors: piezoelectric oscillations

Identifiers: concentric electrodes ; ...

... annular piezoelectric ceramic disc

?

18/3,K/1 (Item 1 from file: 2)

DIALOG(R)File 2:INSPEC

(c) 2003 Institution of Electrical Engineers. All rts. reserv.

7463833 INSPEC Abstract Number: B2003-01-3120B-009, C2003-01-5320C-008

**Title: Dynamics simulation of MEMS device embedded hard disk drive system**

Author(s): Jiaping Yang; Jie Chai; Boon Buan Lim; Shixin Chen

Author Affiliation: Data Storage Inst., Singapore, Singapore

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.4755 p.296-302

Publisher: SPIE-Int. Soc. Opt. Eng,

Publication Date: 2002 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

SICI: 0277-786X(2002)4755L:296:DSMD;1-G

Material Identity Number: C574-2002-286

U.S. Copyright Clearance Center Code: 0277-786X/02/\$15.00

Conference Title: Design, Test, Integration, and Packaging of MEMS/MOEMS 2002

Conference Sponsor: SPIE; CNRS-INPG-UJF; IEEE; IEEE Comput. Soc.; Test Technol. Tech. Council

Conference Date: 6-8 May 2002 Conference Location: Cannes, France

Language: English

Subfile: B C

Copyright 2002, IEE

Abstract: Currently, hard disk drives ( HDD ) use rotating disks to store digital data and **magnetic** recording heads which fly on the disk to read/write data. The recording heads are **mounted** on a **slider** -suspension assembly, which makes the heads move from one track to another on the disk ...

... close-loop feedback servo system. It is well known that the dynamic behavior of head- **slider** -suspension-assembly (HSA) systems are of great influence on the track-per-inch capacity of...

... the secondary stage for MEMS device embedded HSAs, has resulted in more difficulties in predicting **HDD** dynamic performance. This paper presents studies of the problem using a macromodeling simulation approach. It...

... with system dynamics technology, to investigate dynamic characteristics of MEMS actuator embedded HSA systems for **HDD** .

...Descriptors: **magnetic** heads

...Identifiers: **HDD** embedded MEMS device...

...flying **magnetic** recording heads...

...head- **slider** -suspension assembly...

... **HDD** track per inch capacity...

... **HDD** dynamic performance

18/3,K/2 (Item 2 from file: 2)

DIALOG(R)File 2:INSPEC

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6637759 INSPEC Abstract Number: A2000-16-0630C-005, B2000-08-7320C-029

**Title: Measurement of 3-D position and orientation of rigid bodies using a 3-facet mirror**

Author(s): Park, W.S.; Cho, H.S.; Byun, Y.K.; Park, N.Y.; Jung, D.K.

Author Affiliation: Dept. of Mech. Eng., Korea Adv. Inst. of Sci. & Technol., Seoul, South Korea

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.3835 p.2-13

Publisher: SPIE-Int. Soc. Opt. Eng,

Publication Date: 1999 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

SICI: 0277-786X(1999)3835L:2:MPOR;1-P

Material Identity Number: C574-2000-010

U.S. Copyright Clearance Center Code: 0277-786X/99/\$10.00

Conference Title: Three-Dimensional Imaging, Optical Metrology, and Inspection V

Conference Sponsor: SPIE

Conference Date: 19-20 Sept. 1999 Conference Location: Boston, MA, USA

Language: English

Subfile: A B

Copyright 2000, IEE

...Abstract: its bottom surface. We call this mirror 3-facet mirror. The 3-facet mirror is **mounted** on the object whose position and orientation are to be measured. The measurement is operated...

... principle, we can get the 3-D position and orientation of any object simply by **mounting** the 3-facet mirror on the object. In this paper, we model the relationship between...

...Identifiers: HDD **magnetic** disks...

...flying **sliders** ;

18/3,K/3 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

(c) 2003 Institution of Electrical Engineers. All rts. reserv.

6375571 INSPEC Abstract Number: B1999-11-8380M-015, C1999-11-5320C-016

**Title: Micro-actuator for tera-storage**

Author(s): Hirano, T.; Long-Sheng Fan; Semba, T.; Lee, W.Y.; John Hong; Pattanaik, S.; Webb, P.; Wen-Han Juan; Susanna Chan

Author Affiliation: Res. Div., IBM Corp., San Jose, CA, USA

Conference Title: Technical Digest. IEEE International MEMS 99 Conference. Twelfth IEEE International Conference on Micro Electro Mechanical Systems (Cat. No.99CH36291) p.441-6

Publisher: IEEE, Piscataway, NJ, USA

Publication Date: 1999 Country of Publication: USA xxxvi+660 pp.

ISBN: 0 7803 5194 0 Material Identity Number: XX-1999-00115

U.S. Copyright Clearance Center Code: 0 7803 5194 0/99/\$10.00

Conference Title: Proceedings of 12th International Workshop on Micro Electro Mechanical Systems - MEMS

Conference Sponsor: IEEE Robotics & Autom. Soc

Conference Date: 17-21 Jan. 1999 Conference Location: Orlando, FL, USA

Language: English

Subfile: B C

Copyright 1999, IEE

...Abstract: of current hard-disk drives (HDDs) was investigated. This micro-actuator is located between a **slider** and a suspension, and moves the **magnetic** head ( **attached** on the edge of the **slider** ) with very high speed and accuracy. As a result, extremely high data-track density (thus...

... assembled. A servo experiment was carried out by using a commercially

available 3.5 inch **HDD** . High servo bandwidth of 2.4 kHz, high track-following accuracy of 0.0275  $\mu$ m...

...Identifiers: **magnetic** head

18/3,K/4 (Item 1 from file: 8)

DIALOG(R)File 8: Ei Compendex(R)

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06121124 E.I. No: EIP02367068611

**Title: Dynamics simulation of MEMS device embedded hard disk drive system**

Author: Yang, Jiaping; Chai, Jie; Lim, Boon Buan; Chen, Shixin

Corporate Source: Data Storage Institute, Singapore 117608, Singapore

Conference Title: Design, Test, Integration, and packaging of MEMS/MOEMS

2002

Conference Location: Cannes, France Conference Date: 20020506-20020508

E.I. Conference No.: 59481

Source: Proceedings of SPIE - The International Society for Optical Engineering v 4655 2002. p 296-302

Publication Year: 2002

CODEN: PSISDG ISSN: 0277-786X

Language: English

Abstract: Currently, hard disk drives ( **HDD** ) use rotating disks to store digital data and **magnetic** recording heads are flying on the disk to read/write data. The recording heads are **mounted** on a **slider** -suspension assembly, which makes heads move from one track to another on the disk. The...

...by close-loop feedback servo system. It is well known that dynamic behaviors of head- **slider** -suspension-assembly (HSA) system are of great influence on the track per inch capacity of **HDD** . As the problem is structurally complex, it is usually investigated using experimental methods or finite...

...the secondary stage for MEMS device embedded HSA, has resulted in more difficulties in predicting **HDD** dynamic performance. This paper presents studies of the problem using macromodeling simulation approach. It applies ...

...with system dynamics technology to investigate dynamic characteristics of MEMS actuator embedded HSA system for **HDD** . 7 Refs.

Descriptors: Microelectromechanical devices; Embedded systems; Hard disk storage; Rotating disks; **Magnetic** heads; **Magnetic** recording; Closed loop control systems; Feedback control; Servomechanisms; Finite element method; Boundary element method; Computer...

Identifiers: **Slider** -suspension assemblies; **Magnetic** recording heads

18/3,K/5 (Item 2 from file: 8)

DIALOG(R)File 8: Ei Compendex(R)

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05810760 E.I. No: EIP01204958109

**Title: High-bandwidth HDD tracking servo by a moving- slider micro-actuator**

Author: Hirano, Toshiki; Fan, Long-Sheng; Semba, Tetsuo; Lee, Wen Y.; Hong, John; Pattanaik, Surya; Webb, Patrick; Juan, Wen-Han; Chan, Susanna

Corporate Source: IBM Corp, San Jose, CA, United States

Conference Title: Proceedings of the 1999 International Magnetism

Conference (INTERMAG '99)

Conference Location: Kyongju, South Korea Conference Date:  
19990518-19990521

E.I. Conference No.: 56196

Source: IEEE Transactions on Magnetism v 35 n 5 pt 2 Sep 1999. p  
3670-3672

Publication Year: 1999

CODEN: IEMGAQ ISSN: 0018-9464

Language: English

**Title: High-bandwidth HDD tracking servo by a moving- slider  
micro-actuator**

...Abstract: paper describes a micro-actuator for high-bandwidth tracking  
servo, where a micro-actuator is **attached** between **slider** and  
suspension, and moves the **slider** relative to the suspension. The  
micro-actuator frequency response measurement proved that this  
micro-actuator...

Descriptors: **Magnetic** devices; Microactuators; Bandwidth;  
Servomechanisms; Damping; Frequency response

Identifiers: Moving- **slider** micro-actuators; High-bandwidth tracking  
servomechanisms; Spring mass damper systems

18/3,K/6 (Item 1 from file: 94)

DIALOG(R)File 94:JICST-EPlus

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04090152 JICST ACCESSION NUMBER: 99A0412324 FILE SEGMENT: JICST-E

**A Micro-Actuator for HDD Tracking Servo.**

HIRANO TOSHIKI (1); FAN L-S (1); SEMBA TETSUO (1); LEE W Y (1); HONG J (1);

PATTANAIAK S (1); WEBB P (1); JUAN W-H (1); CHAN S (1)

(1) Ibm Corp., Ca

Nippon Oyo Jiki Gakkaishi(Journal of the Magnetism Society of Japan), 1999

, VOL.23,NO.5, PAGE.1746-1751, FIG.12, REF.14

JOURNAL NUMBER: Z0944AAE ISSN NO: 0285-0192

UNIVERSAL DECIMAL CLASSIFICATION: 681.327 621.382.002.2 621.3:681.327.1

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Original paper

MEDIA TYPE: Printed Publication

**A Micro-Actuator for HDD Tracking Servo.**

...ABSTRACT: of current hard-disk drives (HDDs) was investigated. This  
micro-actuator is located between a **slider** and a suspension, and  
moves the **magnetic** head ( **attached** on the edge of the **slider** ) with  
very high speed and accuracy. As a result, extremely high data-track  
density (thus...

...assembled. A servo experiment was carried out by using a commercially  
available 3.5 inch **HDD** . High servo bandwidth of 2.4 kHz, high  
track-following accuracy of 0.0275.MU...

...DESCRIPTORS: **magnetic** disk memory...

... **magnetic** head

...BROADER DESCRIPTORS: **magnetic** memory...

... **magnetic** component

18/3,K/7 (Item 2 from file: 94)

DIALOG(R)File 94:JICST-EPlus

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01149545 JICST ACCESSION NUMBER: 91A0041794 FILE SEGMENT: JICST-E  
**High performance parallel bonded fine enamelled wire for HDD magnetic head coil.**

TAKAHASHI SHIGEMI (1); HANAOKA KAZUO (1); CHABATA SUEHARU (1); TSUBOI TAKAO (1); TAKEMURA HIROHITO (2)

(1) Fujikura Ltd.; (2) Fujikuramagunettowaiya

Fujikura Giho, 1990, NO.79, PAGE.59-64, FIG.16, TBL.2, REF.6

JOURNAL NUMBER: F0077ABE ISSN NO: 0912-2761

UNIVERSAL DECIMAL CLASSIFICATION: 681.327

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Original paper

MEDIA TYPE: Printed Publication

**High performance parallel bonded fine enamelled wire for HDD magnetic head coil.**

...ABSTRACT: However, even at present, conventional two separate fine enamelled wires have being generally wound to **magnetic head slider** by hands as bifilar coil for hard disk drive head. Conventional two separate fine enamelled wires windings have still remaining research programs, for example, inductance fluctuation of bifilar coil in **magnetic head** and windability to **magnetic head slider**. From these reasons, high performance parallel bonded fine enamelled wire which has excellent dielectric strength...

DESCRIPTORS: **magnetic disk memory...**

... **magnetic head**

BROADER DESCRIPTORS: **magnetic memory...**

... **magnetic component...**

...bonding and joining ;

18/3,K/8 (Item 1 from file: 144)

DIALOG(R)File 144:Pascal

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15374003 PASCAL No.: 02-0062202

**A MEMS-based monolithic electrostatic microactuator for ultra-low magnetic disk head fly height control**

**Selected Papers from the Eighth Joint Magnetism and Magnetic Materials-International Magnetism Conference (MMM-Intermag), San Antonio, TX, January 7-11, 2001**

FANG CHEN; HUIKAI XIE; FEDDER Gary K

Data Storage Systems Center, Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA 15213, United States; Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA 15213, United States; Department of Electrical and Computer Engineering and the Robotics Institute, Carnegie Mellon University, Pittsburgh, PA 15213, United States

Joint MMM-Intermag Conference, 8 (San Antonio, TX USA) 2001-01-07

Journal: IEEE transactions on magnetics, 2001, 37 (4 PART1) 1915-1918

Language: English

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**A MEMS-based monolithic electrostatic microactuator for ultra-low**

magnetic disk head fly height control

Selected Papers from the Eighth Joint Magnetism and Magnetic Materials-International Magnetism Conference (MMM-Intermag), San Antonio, TX, January 7-11, 2001

... control below 10 nm. Different from prior work on MEMS-based electrostatic microactuators designed for **magnetic** hard disk drives ( HDD ), the proposed microactuator is fabricated monolithically with a conventional head/ **slider** design. The actuator is micromachined into the same side as the head element on a **slider** with a modified CMOS-MEMS process. It has an extremely small size, light weight and...

English Descriptors: **Magnetic** storage; Hard disk; **Magnetic** disk; Microactuators; Electrostatic actuators; Head disk interface; Disk drive; Magnetoresistive device; Design; Manufacturing; Experimental study

Spanish Descriptors: Memoria **magnetica** ; Disco duro; Disco **magnetico** ; Interfase cabeza disco; Lector disco; Dispositivo magnetoresistivo; Diseno; Fabricacion; Estudio experimental

?

20/3,K/1 (Item 1 from file: 2)

DIALOG(R)File 2:INSPEC

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7149853 INSPEC Abstract Number: B2002-02-8380M-006, C2002-02-5320C-009

**Title: Rotary piezoelectric actuator for dual stage actuation system in high-density hard disk drive**

Author(s): Zhihong Wang; Weiguang Zhu; Xi Yao; **Shiraishi, M.**

Author Affiliation: Microelectron. Centre, Nanyang Technol. Univ., Singapore, Singapore

Journal: Journal of Information Storage and Processing Systems vol.3, no.3-4 p.247-52

Publisher: Birkhauser Boston,

Publication Date: July-Oct. 2001 Country of Publication: USA

CODEN: JISSFY ISSN: 1099-8047

SICI: 1099-8047(200107/10)3:3/4L.247:RPAD;1-T

Material Identity Number: H328-2001-003

U.S. Copyright Clearance Center Code: 1099-8047/01/\$6.00

Language: English

Subfile: B C

Copyright 2002, IEE

**Title: Rotary piezoelectric actuator for dual stage actuation system in high-density hard disk drive**

Author(s): Zhihong Wang; Weiguang Zhu; Xi Yao; **Shiraishi, M.**

Abstract: This paper presents a novel piezoelectric-based multilayer rotary micro- **actuator** for a **dual stage** actuation system used in high-track density hard disk drives. The **actuator**, as the secondary fine **actuator**, could be mounted on a flexure tongue and control the motion of the slider to perform high-frequency track following. The configuration, operation, and fabrication of the **actuator** are described. The controllable stroke of the **actuator** and the resonance frequency of the slider/ **actuator** assembly have been evaluated. A corresponding 14.5 mm HGA integrated with the **actuator** has been designed and dynamics of the HGA have been simulated. The results reveal that the proposed rotary **actuator** is capable of meeting the prescribed stroke and frequency specifications and should be a promising approach to implement the **dual - stage** servo in hard disk drives.

...Descriptors: piezoelectric **actuators**

Identifiers: rotary piezoelectric **actuator** ; ...

... **dual stage** actuation system...

...secondary fine **actuator** ;

20/3,K/2 (Item 1 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

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10160712 Genuine Article#: 491KY No. References: 13

**Title: Rotary piezoelectric actuator for dual stage actuation system in high-density hard disk drive**

Author(s): Wang ZH (REPRINT) ; Zhu WG; Yao X; **Shiraishi M**

Corporate Source: Nanyang Technol Univ,Sch Elect & Elect Engn, Ctr

Microelect,Singapore 639798//Singapore/ (REPRINT); Nanyang Technol

Univ,Sch Elect & Elect Engn, Ctr Microelect,Singapore

639798//Singapore//; Magnet HK Ltd,Dongguan 523087/Guangdong/Peoples R China/

Journal: JOURNAL OF INFORMATION STORAGE AND PROCESSING SYSTEMS, 2001, V3,



N3-4 (JUL-OCT), P247-252  
ISSN: 1099-8047 Publication date: 20010700  
Publisher: BIRKHAUSER BOSTON INC, 675 MASSACHUSETTS AVE, CAMBRIDGE, MA  
02139 USA  
Language: English Document Type: ARTICLE (ABSTRACT AVAILABLE)

**Title: Rotary piezoelectric actuator for dual stage actuation system  
in high-density hard disk drive**

**Author(s):** Wang ZH (REPRINT) ; Zhu WG; Yao X; **Shiraishi M**

**Abstract:** This paper presents a novel piezoelectric-based multilayer rotary micro- **actuator** for a **dual stage** actuation system used in high-track density hard disk drives. The **actuator** , as the secondary fine **actuator** , could be mounted on flexure tongue and control the motion of the slider to perform high-frequency track following. The configuration, operation, and fabrication of the **actuator** are described. The controllable stroke of the **actuator** and the resonance frequency of the slider/ **actuator** assembly have been evaluated. A corresponding 14.5 mm HGA integrated with the **actuator** has been designed and dynamics of the HGA have been simulated. The results reveal that the proposed rotary **actuator** is capable of meeting the prescribed stroke and frequency specifications and should be a promising approach to implement the **dual - stage** servo in hard disk drives.

?

23/3,K/1 (Item 1 from file: 2)

DIALOG(R)File 2:INSPEC

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6651274 INSPEC Abstract Number: B2000-08-3120B-050, C2000-08-5320C-038

**Title: Track-following controller design of MEMS based dual - stage servos in magnetic hard disk drives**

Author(s): Li, Y.; Horowitz, R.

Author Affiliation: Comput. Mech. Lab., California Univ., Berkeley, CA, USA

Conference Title: Proceedings 2000 ICRA. Millennium Conference. IEEE International Conference on Robotics and Automation. Symposia Proceedings (Cat. No.00CH37065) Part vol.1 p.953-8 vol.1

Publisher: IEEE, Piscataway, NJ, USA

Publication Date: 2000 Country of Publication: USA 4 vol. lxiv+4128 pp.

ISBN: 0 7803 5886 4 Material Identity Number: XX-2000-01051

U.S. Copyright Clearance Center Code: 0 7803 5886 4/2000/\$10.00

Conference Title: Proceedings 2000 ICRA. IEEE International Conference on Robotics and Automation

Conference Sponsor: IEEE Robotics and Autom. Soc

Conference Date: 24-28 April 2000 Conference Location: San Francisco, CA, USA

Language: English

Subfile: B C

Copyright 2000, IEE

**Title: Track-following controller design of MEMS based dual - stage servos in magnetic hard disk drives**

Abstract: A decoupled controller architecture and discrete time pole placement design methodology is proposed for dual - stage servo controller design of magnetic hard disk drives. The methodology was applied to the controller design of a dual - stage servo with a MEMS microactuator (MA) which rotates the slider relative to the gimbal. MIMO and SIMO controllers were designed for cases when the microactuator...

...Descriptors: electrostatic actuators ;

...Identifiers: MEMS based dual - stage servos...

... magnetic hard disk drives...

...discrete time pole placement ;

23/3,K/2 (Item 2 from file: 2)

DIALOG(R)File 2:INSPEC

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03986929 INSPEC Abstract Number: B91063124, C91062927

**Title: Micro-step XY- stage using piezoelectric tube actuator**

Author(s): Matsuda, R.; Kaneko, R.

Author Affiliation: NTT Appl. Electron. Lab., Tokyo, Japan

Conference Title: Proceedings. IEEE Micro Electro Mechanical Systems. An Investigation of Micro Structures, Sensors, Actuators, Machines and Robots (Cat. No.91CH2957-9) p.137-42

Publisher: IEEE, New York, NY, USA

Publication Date: 1991 Country of Publication: USA xiv+288 pp.

ISBN: 0 87942 641 1

U.S. Copyright Clearance Center Code: CH2957-9/91/0000-0137\$01.00

Conference Sponsor: IEEE; IEE of Japan; ASME

Conference Date: 30 Jan.-2 Feb. 1991 Conference Location: Nara, Japan

Language: English  
Subfile: B C

**Title: Micro-step XY- stage using piezoelectric tube actuator**

Abstract: A novel small and simple mu m-order-step XY- stage has been developed. It consists of a cylindrical piezoelectric **actuator** fixed at one end to a baseplate, with one electrode inside the tube and **two** pairs of diametrical electrodes on the outside. A support is attached to the **free end**. The **actuator** is powered by a single cosine waveform voltage by friction force. An analysis shows that...

...its maximum at  $x/\text{sub } 5/(2 \alpha) = 0.626$  when  $\gamma = 3.76$ . The **actuator** drives the substance on the support **two** -dimensionally. The stroke and direction of movement are controlled with a joystick.

Descriptors: electric **actuators** ;

Identifiers: micro-step XY- **stage** ; ...

...piezoelectric tube **actuator** ; ...

...cylindrical piezoelectric **actuator** ;

23/3,K/3 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

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00786312 INSPEC Abstract Number: C75017753

**Title: Disk file actuator**

Author(s): Lissner, R.W.; McMurtry, D.H.; Wilkinson, R.A., Jr.

Author Affiliation: IBM, Armonk, NY, USA

Journal: IBM Technical Disclosure Bulletin vol.17, no.10 p.3016-18

Publication Date: March 1975 Country of Publication: USA

CODEN: IBMTAA ISSN: 0018-8689

Language: English

Subfile: C

**Title: Disk file actuator**

Abstract: A **two - stage** (linear coarse and rotary fine) **actuator** is used in conjunction with a servo concept in which a **two** -layer disk contains both servo and data information. The servo information is permanently written directly beneath the data. The servo head and data head are **mounted** on a common **slider**, which flies over the disk surface and which is of rigid construction. A sector servo...

Descriptors: **actuators** ; ...

... **magnetic** disc and drum storage

Identifiers: **two stage magnetic** disc file **actuator** ; ...

... **slider** ; ...

...coarse linear **actuator** ; ...

...fine rotary **actuator**

23/3,K/4 (Item 1 from file: 8)

DIALOG(R)File 8:EI Compendex(R)

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03057184 E.I. Monthly No: EI9105058779

**Title: Hand-eye system with three-dimensional vision and microgripper for handling flexible wire.**

**Author:** Maruyama, Tsugito; Kanda, Shinji; Sato, Masahiko; Uchiyama, Takashi

**Corporate Source:** Fujitsu Lab Ltd, Kawasaki, Jpn

**Source:** Machine Vision and Applications v 3 n 4 Apr 1990 p 189-199

**Publication Year:** 1990

**CODEN:** MVAPEO **ISSN:** 0932-8092

**Language:** English

...Abstract: projector consists of multiplanar light beams and a single-planar light beam and is robot- **mountable** . The single-planar light is used to simplify the matching of the multiplanar light beams...

...of the grasping force is 0.005 to 0.6 N, enabling high-resolution control. **Two** piezoelectric **actuators** are used in the microgripper fingers and a 3-mm stroke is achieved by amplifying the **actuator** 's displacement using a **two - stage** lever. This system has been used for wire handling in **magnetic disk slider** manufacture, which is a difficult and delicate task. Measurement, grasping, and upper- **stage** insertion had a 100 percent success rate using autorecovery, making the hand-eye system feasible...

23/3,K/5 (Item 1 from file: 94)

DIALOG(R)File 94:JICST-EPlus

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05004910 JICST ACCESSION NUMBER: 01A1009148 FILE SEGMENT: JICST-E  
**Rotary Multilayer Split Morph. A Piezoelectric Microactuator for Dual - Stage Actuation Systems in High Track Density Hard Disk Drives.**

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Jpn J Appl Phys Part 1, 2001, VOL.40,NO.9B, PAGE.5761-5765, FIG.12, TBL.1, REF.10

JOURNAL NUMBER: G0520BAE ISSN NO: 0021-4922

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LANGUAGE: English COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Original paper

MEDIA TYPE: Printed Publication

**Rotary Multilayer Split Morph. A Piezoelectric Microactuator for Dual - Stage Actuation Systems in High Track Density Hard Disk Drives.**

ABSTRACT: A novel annular rotary piezoelectric microactuator has been proposed for a **dual - stage** actuation system for future high track density hard disk drives. The microactuator is designed to be **mounted** on a flexure tongue and drives a **slider** directly to perform high-frequency track following. The configuration and operation of the microactuator are described. The controllable stroke and the resonance frequency of the **slider / actuator** assembly have been evaluated and optimized by finite-element analysis. The results reveal that the designed **actuator / slider** assembly should be a promising addition to the **dual - stage** actuation system. (author abst.)

DESCRIPTORS: **magnetic disk**...

... **magnetic** recorder...

... **magnetic** head

...BROADER DESCRIPTORS: **magnetic** component...

File 344:Chinese Patents Abs Aug 1985-2003/Jan  
          (c) 2003 European Patent Office  
 File 347:JAPIO Oct 1976-2002/Nov(Updated 030306)  
          (c) 2003 JPO & JAPIO  
 File 348:EUROPEAN PATENTS 1978-2003/Mar W03  
          (c) 2003 European Patent Office  
 File 349:PCT FULLTEXT 1979-2002/UB=20030327,UT=20030320  
          (c) 2003 WIPO/Univentio  
 File 350:Derwent WPIX 1963-2003/UD,UM &UP=200321  
          (c) 2003 Thomson Derwent  
 ? ds

Set	Items	Description
S1	3193	AU=(SHANG, P? OR WU, K? OR KASAJIMA, T? OR SHIRAISHI, M? OR SHANG P? OR WU K? OR KASAJIMA T? OR SHIRAISHI M?)
S2	0	S1 AND DUAL()ACTUATOR?
S3	53	S1 AND ACTUATOR?
S4	3	S3 AND ANNULAR

4/5,K/1 (Item 1 from file: 349)  
DIALOG(R)File 349:PCT FULLTEXT  
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00909031 \*\*Image available\*\*

**ROTARY PIEZOELECTRIC MICROACTUATOR WITH AN OPTIMUM SUSPENSION ARRANGEMENT  
MICROACTIONNEUR PIEZOELECTRIQUE ROTATIF COMPORTANT UN ENSEMBLE SUSPENSION  
OPTIMAL**

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Patent and Priority Information (Country, Number, Date):

Patent: WO 200243063 A1 20020530 (WO 0243063)

Application: WO 2000CN487 20001123 (PCT/WO CN0000487)

Priority Application: WO 2000CN487 20001123

Designated States: CN

Main International Patent Class: G11B-015/18

Publication Language: English

Filing Language: English

Fulltext Availability:

Detailed Description

Claims

Fulltext Word Count: 3147

**English Abstract**

The invention relates to a microactuator comprising a movable structure having a symmetric axis about which the movable structure are divided into two parts which can produce the same movement but in opposite directions; two active arms built with piezoelectric material; two stationary structures to connect the two active arms at their two ends, respectively. The invention also relates to a disk drive suspension which is incorporated with the microactuator.

**French Abstract**

L'invention concerne un microactionneur comprenant une structure mobile qui presente un axe symetrique autour duquel la structure mobile est divisee en deux parties qui peuvent produire le meme mouvement mais dans des directions opposees. Ce microactionneur comprend egalement deux bras actifs constitue d'un materiau piezoelectrique, ainsi que deux structures stationnaires destinees a etre raccordees aux deux bras actifs, respectivement a leurs deux extremités. L'invention concerne egalement une suspension pour lecteur de disque, incorporee dans le microactionneur.

Legal Status (Type, Date, Text)

Publication 20020530 A1 With international search report.

Inventor(s):  
SHANG Ping ...

... SHIRAISHI Masashi ...

... WU Kai

Fulltext Availability:  
Detailed Description

Detailed Description

... head (SLD [slider] ) for reading or writing data from or onto the tracks, and an **actuator** connected to a carrier for moving the head across the disk. A servo system receives...  
...positioning information read from the disk by the head, and sends control signals to the **actuator** to move the head to the desired track and keep following it when the head...  
...SLD flying over information tracks of the disks is mounted on a suspension of the **actuator** , which has a load beam with a base plate on one end (proximal end), and...  
...maintain the flying SLD stability. The base plate of the suspension is mounted to the **actuator** arm, which is controlled by the servo system to position the SLD. A similar mechanism ...  
...disk storage capacity is increasing all of the time, it becomes more difficult for the **actuator** and servo system to position the SLD over the desired track quickly and accurately. Many...  
...systems since the inicroactuators are added to the suspensions and will work with the previous **actuators** together.  
Recently, piezoelectric materials are used more and more in Microactuators that can extend or...formed of piezoelectric materials and built in such a way that they include two parts: **annular** parts and straight parts with a symmetry arrangement about a center line. Arms I and...  
...figure, the suspension assembly 100 includes a load beam 30 with a flexure 40,, an **actuator** 10 on the load beam 30 and a SLD (read/write head) on the flexure...  
...welded to the proximal end 21 of the load beam 30 and mounted to an , **actuator** arm of a disk drive (not shown in FIG. 2).

From FIG. 5 we can...

4/5,K/2 (Item 2 from file: 349)  
DIALOG(R)File 349:PCT FULLTEXT  
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00861664 \*\*Image available\*\*  
DUAL STAGE ACTUATOR SYSTEMS FOR HIGH DENSITY HARD DISK DRIVES USING  
ANNULAR ROTARY PIEZOELECTRIC ACTUATORS

SYSTEMES D'ACTIONNEURS A DEUX ETAGES POUR DISQUE DUR HAUTE DENSITE  
UTILISANT DES ACTIONNEURS PIEZO-ELECTRIQUES ROTATIFS

Patent Applicant/Assignee:

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SHIRAISHI Masashi , Winnerway Industrial Area, Huangcun, Dongguan City,  
Guangdong Province 511700, CN,  
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Sensors & Actuators Laboratory, Nanyang Technological University,  
Nanyang Avenue, Singapore 639798, SG

Legal Representative:

CHINA PATENT AGENT (H K ) LTD (agent), 22/F Great Eagle Centre, 23  
Harbour Road, Wanchai, Hong Kong Special Administrative Region, CN,

Patent and Priority Information (Country, Number, Date):

Patent: WO 200195329 A1 20011213 (WO 0195329)  
Application: WO 2000CN148 20000608 (PCT/WO CN0000148)  
Priority Application: WO 2000CN148 20000608

Designated States: CN

Main International Patent Class: G11B-021/21

International Patent Class: G11B-021/20; G11B-005/60; G11B-005/58

Publication Language: English

Filing Language: English

Fulltext Availability:

Detailed Description

Claims

Fulltext Word Count: 5265

English Abstract

A piezoelectric **actuator** is disclosed including an **annular** piezoelectric element and a base. There is a gap along the radial direction of the **annular** piezoelectric element. One of the two ends, i.e., the fixed end of the said **annular** element, is connected to the base, while the other end is free. The base is made of piezoelectric materials. Furthermore, the **annular** element is divided into two or more **annular** parts along the direction of its circumference by the electrode patterns applied on its two opposite surface and/or its polarization directions. When driving voltages are applied, the **actuator** can generate roughly a rotary motion around the center of the **annular** piezoelectric element. The **annular** rotary **actuator** could be either a single plate or with multilayer structure. The present invention further relates to a dual stage head positioning **actuator** system of a hard disk drive with a plurality of disks and a plurality of vertically aligned head sliders mounted on distal ends of a plurality of suspensions via the **annular** piezoelectric **actuators**.

French Abstract

L'invention concerne un actionneur piezo-electrique comprenant un element annulaire piezo-electrique et une base. Un espacement est pratique le long de la direction radiale de l'element piezo-electrique annulaire. Une des deux extremités, c'est a dire l'extremite fixee de l'element annulaire, est reliee a la base, alors que l'autre extremite reste libre. La base est constituee de materiaux piezo-electriques. L'element



annulaire est, en outre, divise en deux ou plusieurs parties annulaires le long de la direction de sa circonference par les structures d'electrodes appliquees sur ses deux surfaces opposees et/ou ses directions de polarisation. Lorsque que l'on applique des tensions d'entrainement, l'actionneur peut produire grossierement un mouvement rotatif autour du centre de l'element piezo-electrique annulaire. L'actionneur rotatif annulaire peut etre constitue d'une plaque unique ou d'une structure a couches multiples. L'invention concerne aussi un systeme d'actionneur de positionnement de tete a deux etages d'un disque dur contenant plusieurs disques et plusieurs glisseurs de tete alignes montes sur des extremités distales de plusieurs suspensions via les actionneurs piezo-electriques annulaires.

Legal Status (Type, Date, Text)

Publication 20011213 A1 With international search report.

**DUAL STAGE ACTUATOR SYSTEMS FOR HIGH DENSITY HARD DISK DRIVES USING ANNULAR ROTARY PIEZOELECTRIC ACTUATORS**

Inventor(s):

WU Kai ...

... SHIRAIISHI Masashi ...

... SHANG Ping

Fulltext Availability:

Detailed Description

Claims

English Abstract

A piezoelectric **actuator** is disclosed including an **annular** piezoelectric element and a base. There is a gap along the radial direction of the **annular** piezoelectric element. One of the two ends, i.e., the fixed end of the said **annular** element, is connected to the base, while the other end is free. The base is made of piezoelectric materials. Furthermore, the **annular** element is divided into two or more **annular** parts along the direction of its circumference by the electrode patterns applied on its two opposite surface and/or its polarization directions. When driving voltages are applied, the **actuator** can generate roughly a rotary motion around the center of the **annular** piezoelectric element. The **annular** rotary **actuator** could be either a single plate or with multilayer structure. The present invention further relates to a dual stage head positioning **actuator** system of a hard disk drive with a plurality of disks and a plurality of vertically aligned head sliders mounted on distal ends of a plurality of suspensions via the **annular** piezoelectric **actuators** .

Detailed Description

**DUAL STAGE ACTUATOR SYSTEMS FOR HIGH DENSITY HARD DISK DRIVES USING ANNULAR ROTARY PIEZOELECTRIC ACTUATORS**  
**FIELD OF THE INVENTION**

I 0 The present invention generally relates to the field of piezoelectric devices and more particularly, but not by way of limitation, to an **annular** rotary piezoelectric **actuator** suitable for use as a secondary fine **actuator** in a dual stage head positioning servo system of a hard disk drive and to a dual stage **actuator** system for a high density hard disk drive using the **annular** rotary piezoelectric **actuator** .

**DESCRIPTION OF THE RELATED ART**

Piezoelectric **actuators** have been used as positioners or driving motors in a broad spectrum of fields such...

4/5,K/3 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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014385133 \*\*Image available\*\*  
WPI Acc No: 2002-205836/200226  
XRPX Acc No: N02-156786

**Dual stage piezoelectric actuator for high density hard disk drives to obtain high bandwidth head positioning servo system**

Patent Assignee: XINKE IND CO LTD (XINK-N); KASAJIMA T (KASA-I); SHANG P (SHAN-I); SHIRAISHI M (SHIR-I); WU K (WUKK-I); SAE MAGNETICS HK LTD (SAEM-N)

Inventor: KASAJIMA T; SHANG P; SHIRAISHI M; WU K; WANG Z

Number of Countries: 002 Number of Patents: 003

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200195329	A1	20011213	WO 2000CN148	A	20000608	200226 B
US 20010055182	A1	20011227	US 2001811112	A	20010316	200226
CN 1378690	A	20021106	CN 2000809524	A	20000608	200316
			WO 2000CN148	A	20000608	

Priority Applications (No Type Date): WO 2000CN148 A 20000608

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200195329	A1	E	28	G11B-021/21	
Designated States (National): CN					
US 20010055182	A1			G11B-005/56	
CN 1378690	A			G11B-021/21	

Abstract (Basic): WO 200195329 A1

NOVELTY - Includes an **annular** piezoelectric element and a base, with a gap along its radial direction. The fixed end of the **annular** element, is connected to the base, while the other end is free. The base is made of piezoelectric materials.

DETAILED DESCRIPTION - The **annular** element is divided into two **annular** parts along its circumference by the electrode patterns applied on its two opposite surfaces. When driving voltages are applied; the **actuator** can generate roughly a rotary motion around the center of the **annular** piezoelectric element. An INDEPENDENT CLAIM is included for a method.

USE - For high density hard disk drives.

ADVANTAGE - Can be positioned between the suspension and slider to drive the magnetic pole tip of the slider to move across the data track so as to obtain a high bandwidth head positioning servo system.

DESCRIPTION OF DRAWING(S) - The drawing shows a perspective view of the **annular** split morph.

pp; 28 DwgNo 1/13

Title Terms: DUAL; STAGE; PIEZOELECTRIC; ACTUATE; HIGH; DENSITY; HARD; DISC ; DRIVE; OBTAIN; HIGH; BANDWIDTH; HEAD; POSITION; SERVO; SYSTEM

Derwent Class: T03; V06

International Patent Class (Main): G11B-005/56; G11B-021/21

International Patent Class (Additional): G11B-005/58; G11B-005/60; G11B-021/20; G11B-021/24

File Segment: EPI

**Dual stage piezoelectric actuator for high density hard disk drives to obtain high bandwidth head positioning servo system**

...Inventor: SHANG P ...

... SHIRAISHI M ...

... WU K

Abstract (Basic):

... Includes an **annular** piezoelectric element and a base, with a gap along its radial direction. The fixed end of the **annular** element, is connected to the base, while the other end is free. The base is...

... The **annular** element is divided into two **annular** parts along its circumference by the electrode patterns applied on its two opposite surfaces. When driving voltages are applied; the **actuator** can generate roughly a rotary motion around the center of the **annular** piezoelectric element. An INDEPENDENT CLAIM is included for a method...

...The drawing shows a perspective view of the **annular** split morph...  
?

File 348:EUROPEAN PATENTS 1978-2003/Mar W03

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File 349:PCT FULLTEXT 1979-2002/UB=20030327,UT=20030320

(c) 2003 WIPO/Univentio

? ds

Set	Items	Description
S1	66304	ACTUATOR?
S2	200	S1(5N) (DUAL OR TWO) (3N)STAGE??
S3	4	ANNULAR?(10N) (PIEZOELECTRIC OR PIEZO()ELECTRIC) (S)CONCENTR- IC?(S)ELECTRODE?
S4	30040	(RING OR C) () (SHAPE? OR CONSTRUCTION OR DESIGN??)
S5	1081	RADIAL()GAP??
S6	433	FIX?()END(S)BASE
S7	47583	FREE()END
S8	523	(ATTACH? OR JOIN? OR MOUNT? OR PLACING OR PLACEMENT) (10N)M- AGNETIC?(7N)SLIDER?
S9	2178	HDD OR HIGH()DENSITY()DIS??????()DRIVE??
S10	33038	IC=G11B?
S11	0	S2(S)S3
S12	6	S2(S)S4:S8
S13	6	S12 NOT S3
S14	51	S2 AND S10
S15	0	S14(S)S6(S)S7
S16	0	S14(S)S4
S17	2	S14(S)S8

3/3,K/1 (Item 1 from file: 348)  
DIALOG(R) File 348:EUROPEAN PATENTS  
(c) 2003 European Patent Office. All rts. reserv.

00734895

**Ink jet recording device**

**Tintenstrahlzeichnungsgerät**

**Dispositif d'enregistrement a jet d'encre**

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PATENT (CC, No, Kind, Date): EP 692383 A2 960117 (Basic)  
EP 692383 A3 970709

APPLICATION (CC, No, Date): EP 95304796 950710;

PRIORITY (CC, No, Date): JP 94158515 940711; JP 94238102 940930; JP 9545661  
950306; JP 9547290 950307

DESIGNATED STATES: DE; FR; GB; IT

INTERNATIONAL PATENT CLASS: B41J-002/04;

ABSTRACT WORD COUNT: 169

LANGUAGE (Publication,Procedural,Application): English; English; English  
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPAB96	2449
SPEC A	(English)	EPAB96	44614
Total word count - document A			47063
Total word count - document B			0
Total word count - documents A + B			47063

...SPECIFICATION 14 is Fresnel-divided, forming discrete electrodes 14(sub 1) to 14(sub 6). The **piezoelectric** disc 13 may also be divided into **concentric annular** members, of which the odd-numbered ones form a first group and the even-numbered...14 is Fresnel-divided, forming discrete electrodes 14(sub 1) to 14(sub 6). The **piezoelectric** disc 13 may also be divided into **concentric annular** members, of which the odd-numbered ones form a first group and the even-numbered...

...method. First, a disc-shaped electrode is be formed on the lower surface of the **piezoelectric** disc 13. Then, **concentric annular electrodes** are formed on the upper surface of the disk 13. Next, the odd-numbered annular **electrodes** are polarized in one direction, and the even-numbered annular **electrodes** are polarized in the opposite direction. This done, a disc-shaped common **electrode** is formed on the annular **electrodes** , by means of sputtering or the like.

(Embodiment 8-3)

FIG. 71 is a perspective...

3/3,K/2 (Item 2 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
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00431570

**Piezoelectric/electrostrictive actuator**

**Piezoelektrischer/elektrostriktiver Antrieb**

**Organe d'actionnement piezoelectrique/electrostrictif**

PATENT ASSIGNEE:

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PATENT (CC, No, Kind, Date): EP 408305 A2 910116 (Basic)  
EP 408305 A3 911121  
EP 408305 B1 960313

APPLICATION (CC, No, Date): EP 90307519 900710;

PRIORITY (CC, No, Date): JP 89178747 890711; JP 8911173 900120

DESIGNATED STATES: DE; FR; GB; IT

INTERNATIONAL PATENT CLASS: H01L-041/09;

ABSTRACT WORD COUNT: 108

LANGUAGE (Publication,Procedural,Application): English; English; English  
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	413
CLAIMS B	(English)	EPAB96	470
CLAIMS B	(German)	EPAB96	431
CLAIMS B	(French)	EPAB96	531
SPEC A	(English)	EPABF1	4026
SPEC B	(English)	EPAB96	3938
Total word count - document A			4439
Total word count - document B			5370
Total word count - documents A + B			9809

...SPECIFICATION of Fig. 2, the electrodes 4 are formed as concentric circular strips 4, while the **piezoelectric** /electrostrictive elements 6 are formed so as to fill **annular** spaces defined between the adjacent circular strips 4. A voltage is applied between the adjacent **electrode** strips 4 through connecting portions 10. In the actuator shown in Fig. 11, the **electrodes** 4 take the form of two spiral strips formed on one of the opposite major...

...elements 6 are formed so as to fill spiral spaces defined between the two spiral **electrode** strips 4.

Referring to Figs. 3 and 4, there are shown modifications of the embodiment...

...SPECIFICATION one of the opposite major surfaces of the square substrate 2 of Fig. 2, the **electrodes** 4 are formed as **concentric** circular strips 4, while the **piezoelectric** /electrostrictive elements 6 are formed so as to fill **annular** spaces defined between the adjacent circular strips 4. A voltage is applied between the adjacent **electrode** strips 4 through connecting portions 10. In the actuator shown in Fig. 11, the **electrodes** 4 take the form of two spiral strips formed on one of the opposite major...

...elements 6 are formed so as to fill spiral spaces defined between the two spiral **electrode** strips 4.

Referring to Figs. 3 and 4, there are shown modifications of the embodiment...

3/3,K/3 (Item 1 from file: 349)

DIALOG(R) File 349:PCT FULLTEXT

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00193794

**ULTRASONIC NONDIFFRACTING TRANSDUCER**

**TRANSDUCTEUR ULTRASONIQUE NON DIFFRACTANT**

Patent Applicant/Assignee:

MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH,

Inventor(s):

LU Jian-yu,

GREENLEAF James Fowler,

Patent and Priority Information (Country, Number, Date):

Patent: WO 9111145 A1 19910808

Application: WO 91US353 19910117 (PCT/WO US9100353)

Priority Application: US 90457 19900129

Designated States: AT BE CA CH DE DK ES FR GB GR IT JP LU NL SE

Publication Language: English

Fulltext Word Count: 4545

Fulltext Availability:

## Claims

### Claim

... in which the central axis extends substantially perpendicular from said one flat surface of the **piezoelectric** element and the active **electrode** segments --r= formed as **annular** shaped rings disposed **concentrically** around the central axis.

3 The ultrasonic transducer system as recited in claim 1 in...

3/3,K/4 (Item 2 from file: 349)

DIALOG(R)File 349:PCT FULLTEXT

(c) 2003 WIPO/Univentio. All rts. reserv.

00158510

IC PROCESSED PIEZOELECTRIC MICROPHONE

MICROPHONE PIEZO-ELECTRIQUE A CIRCUIT INTEGRE

Patent Applicant/Assignee:

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,

Inventor(s):

MULLER Richard S,

KIM Eun Sok,

Patent and Priority Information (Country, Number, Date):

Patent: WO 8904881 A1 19890601

Application: WO 88US4195 19881122 (PCT/WO US8804195)

Priority Application: US 87375 19871125; US 88826 19880819

Designated States: AT BE CH DE FR GB IT JP LU NL SE

Publication Language: English

Fulltext Word Count: 5090

### English Abstract

...21) encapsulated in chemical vapor deposited silicon dioxide (23, 29).

A series of annular, basically **concentric**, polysilicon **electrodes** (25) are provided in the silicon dioxide (23) between the piezoelectric film (21) and the diaphragm (22) and in contact with the **piezoelectric** film (21). A series of **annular**, basically **concentric**, aluminum **electrodes** (24) are on the opposite side of the piezoelectric film (21) from the polysilicon **electrodes** (25) and are aligned with the polysilicon **electrodes**; they lie over the silicon dioxide (29), and are in contact with the piezoelectric film...

?



13/3,K/1 (Item 1 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
(c) 2003 European Patent Office. All rts. reserv.

01436246

**A magnetic disk drive and the control method thereof**

**Magnetplattenlaufwerk und Steuervorrichtung**

**Unite de disque magnetique et sa commande**

PATENT ASSIGNEE:

Hitachi, Ltd., (204151), 6, Kanda Surugadai 4-chome, Chiyoda-ku, Tokyo  
101-8010, (JP), (Applicant designated States: all)

INVENTOR:

Shimokoshi, Masayoshi, c/o Hitachi Ltd., IPG, New Marunouchi Bldg., 5-1,  
Marunouchi 1-chome, , Chiyoda-ku, Tokyo 100-8220, (JP)

Doi, Takeshi, c/o Hitachi Ltd., IPG, New Marunouchi Bldg., 5-1,  
Marunouchi 1-chome, , Chiyoda-ku, Tokyo 100-8220, (JP)

LEGAL REPRESENTATIVE:

Strehl Schubel-Hopf & Partner (100941), Maximilianstrasse 54, 80538  
Munchen, (DE)

PATENT (CC, No, Kind, Date): EP 1220207 A2 020703 (Basic)

APPLICATION (CC, No, Date): EP 2001115827 010628;

PRIORITY (CC, No, Date): JP 2000355642 001117; JP 2001112163 010411

DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI;  
LU; MC; NL; PT; SE; TR

EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI

INTERNATIONAL PATENT CLASS: G11B-005/55; G11B-005/596; G11B-021/08

ABSTRACT WORD COUNT: 139

NOTE:

Figure number on first page: 5

LANGUAGE (Publication,Procedural,Application): English; English; English  
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200227	1844
SPEC A	(English)	200227	6146
Total word count - document A			7990
Total word count - document B			0
Total word count - documents A + B			7990

...SPECIFICATION and a precision control mechanism for performing a precision positioning.

A typical example of the **two - stage actuator** has a precision control mechanism installed either on a head suspension itself **mounted** on a conventional rotary actuator or directly on a **magnetic head-mounting slider**. The precision control is done by using a piezoelectric element, and the **magnetic** head is finely oscillated by the piezoelectric element which is **mounted** either on the head suspension or directly on the **slider** having the **magnetic** head. The "oscillation of the **magnetic** head" means finely moving the **magnetic** head by sending a signal to the precision control mechanism of the **two - stage actuator** or applying predetermined displacements to it.

Although the periodic oscillation is expected to reduce the...magnetic disk drive is normally filled with air and the viscosity of air between the **magnetic** disk medium and the **slider mounting** the **magnetic** head may cause pitching vibrations which are not desirable to the drive. The oscillation frequency...

...to 300 kHz and must be avoided. Further, the characteristics of the element of the **two - stage actuator** that performs the precision control and the inertial mass and others of the **magnetic head-mounting**

slider combine to determine the upper limit of the oscillation frequency, at around 500 kHz. If...

13/3,K/2 (Item 2 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
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01149356

HEAD SUPPORT MECHANISM, INFORMATION RECORDING / REPRODUCING APPARATUS, AND  
METHOD OF MANUFACTURING HEAD SUPPORT MECHANISM  
MAGNETKOPF-AUFHAENGUNG, INFORMATIONS-AUFZEICHNUNGS- UND WIEDERGABEVORRICHTU  
NG, UND EINE METHODE ZUR HERSTELLUNG EINER MAGNETKOPF-AUFHAENGUNG  
MECANISME DE SUPPORT DE TETE, APPAREIL D'ENREGISTREMENT / REPRODUCTION  
D'INFORMATIONS ET PROCEDE DE FABRICATION D'UN MECANISME DE SUPPORT DE  
TETE

PATENT ASSIGNEE:

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza-Kadoma,  
Kadoma-shi, Osaka 571-8501, (JP), (Applicant designated States: all)

INVENTOR:

YOKOYAMA, Kazuo, 1-30-7 Kitayama, Hirakata-shi, Osaka 573-0171, (JP)  
YAMAMOTO, Shinichi, 174-10 Kuzuhamentori, Hirakata-shi, Osaka 573-1113,  
(JP)

IRIE, Yousuke, 44-405 Tsurumaidanchi, Iban, Tsurumaihighashimachi,  
Nara-shi, Nara 631-0021, (JP)

KUWAJIMA, Hideki, 36-3 Shimobettoucho, Kitashirakawa, Sakyo-ku,  
Kyoto-shi, Kyoto 606-8286, (JP)

SAKAMOTO, Kenichi, 1-4-1-223 Uenohigashi, Toyonaka-sshi, Osaka 560-0013,  
(JP)

MATSUOKA, Kaoru, 2-4-17 Morishoji, Asahi-ku, Osaka-shi, saka 353-0013,  
(JP)

KANNO, Isaku, 5-7-22, Tezukayama, Nara-shi, Nara 631-0062, (JP)

FUJII, Satoru, 1-14-12 Tsukawaki, Takatsuki-shi, Osaka 569-1036, (JP)

LEGAL REPRESENTATIVE:

Schwabe - Sandmair - Marx (100951), Stuntzstrasse 16, 81677 Munchen, (DE)

PATENT (CC, No, Kind, Date): EP 1152401 A1 011107 (Basic)

WO 200016318 000323

APPLICATION (CC, No, Date): EP 99943376 990916; WO 99JP5061 990916

PRIORITY (CC, No, Date): JP 98261147 980916; JP 98334802 981125; JP 9952015  
990226

DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI;  
LU; MC; NL; PT; SE

INTERNATIONAL PATENT CLASS: G11B-005/60

ABSTRACT WORD COUNT: 65

NOTE:

Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; Japanese  
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200145	3139
SPEC A	(English)	200145	13719
Total word count - document A			16858
Total word count - document B			0
Total word count - documents A + B			16858

...SPECIFICATION used in addition to the first stage or the main driving means. As such a **two - stage** controlled **actuator** , a mode in which a head support mechanism (i. e., suspension) is driven, a mode in which a slider is driven, a mode in which a head element is **mounted** on a

**slider** , and the like, have been devised.

The functions of a head support mechanism of a **magnetic** disk apparatus include pressuring a **slider** toward a disk against a force acting on the **slider** due to the proximity flying, or contact with, a rotating disk, causing the slider to...

...Speech Papers (IV) (1998, March 31 to April 3, Tokyo), pp. 208-209 discloses a **two - stage** controlled **actuator** mounted on a back face of a slider. This amounts to a driving mode in...

...above-described conventional example disclosed in Japanese Laid-open Publication No. 9-73746. Since this **two - stage** controlled **actuator** is of a type which is **mounted** on the back face of a **slider** , a thickness of the **magnetic** disk apparatus in a height direction thereof is increased, which hinders the reduction in size...

13/3,K/3 (Item 3 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
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01135978

**Feed, implementation and control system for an internal combustion engine with injected gas feed**

**Zufuhr-und Steuervorrichtung fur Brennkraftmaschine mit gasformigen Brennstoff**

**Systeme d'alimentation et de controle pour moteur a combustion interne alimente en gaz**

PATENT ASSIGNEE:

Landi Renzo S.p.A., (2689350), Via Fratelli Cervi, 75/2, 42100 Reggio Emilia, (IT), (Applicant designated States: all)

INVENTOR:

Landi, Stefano, Viale Monte Pasubio, 10, 42100 Reggio Emilia, (IT)

LEGAL REPRESENTATIVE:

Giambrocono, Alfonso, Dr. Ing. et al (40521), Ing. A. Giambrocono & C. S.r.l. Via Rosolino Pilo 19/B, 20129 Milano, (IT)

PATENT (CC, No, Kind, Date): EP 992673 A2 000412 (Basic)  
EP 992673 A3 001122

APPLICATION (CC, No, Date): EP 99104454 990305;

PRIORITY (CC, No, Date): IT 98MI2167 981008

DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; NL; PT; SE

EXTENDED DESIGNATED STATES: LT; LV; MK; RO; SI

INTERNATIONAL PATENT CLASS: F02M-021/02

ABSTRACT WORD COUNT: 246

NOTE:

Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; Italian  
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200015	780
SPEC A	(English)	200015	3341
Total word count - document A			4121
Total word count - document B			0
Total word count - documents A + B			4121

...SPECIFICATION control unit for both functions cannot be included initially, at the engine design and construction **stage** .

Conveniently, said proportioning **actuator** has **two** ports, one of

which is of considerably greater area than the other. The said first...

...the cross-sectional area of the needle decreasing along it in the direction of the **free end** of the needle, with each needle there being associated a means (for example a stepping...

13/3,K/4 (Item 4 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
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01115647

**Method and apparatus for controlling a dual stage actuator in a disk drive system**

**Verfahren und Anordnung zur Steuerung eines Zweistufiges Aktuators eines Plattenlaufwerkes**

**Methode et appareil pour gerer la commande d'un actuateur a deux etapes d'un systeme a disque**

PATENT ASSIGNEE:

STMicroelectronics, Inc., (723062), 1310 Electronics Drive, Carrollton, TX 75006-5039, (US), (Applicant designated States: all)

INVENTOR:

Hvostov, Harry, 139 Showhegan Court, San Jose, California 95139, (US)

Sun, Yu, 4250 Albany Drive, F-204, San Jose, California 95129, (US)

LEGAL REPRESENTATIVE:

Palmer, Roger et al (34631), PAGE, WHITE & FARRER 54 Doughty Street, London WC1N 2LS, (GB)

PATENT (CC, No, Kind, Date): EP 977181 A2 000202 (Basic)

APPLICATION (CC, No, Date): EP 99305941 990727;

PRIORITY (CC, No, Date): US 126962 980731

DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE

EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI

INTERNATIONAL PATENT CLASS: G11B-005/55

ABSTRACT WORD COUNT: 169

NOTE:

Figure number on first page: 7

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200005	985
SPEC A	(English)	200005	3431
Total word count - document A			4416
Total word count - document B			0
Total word count - documents A + B			4416

...SPECIFICATION accuracy required for magnetic disks with high track density because of its low bandwidth.

A **dual stage actuator** has been developed with a bandwidth of about 1.5 to 2.1 kilohertz. The **dual stage actuator** and its operation are described in Angular Micropositioner For Disk Drives, David A. Horsley, Angad...

...Vol. 6, 1997 (Aggarwal et al.), both of which are incorporated herein by reference. The **dual stage actuator** comprises a microactuator mounted to the **free end** of the arm 12 shown in Figure 1. An exploded view of the elements of a **dual stage actuator** 18 are shown in Figure 2. A microactuator 20 is mounted to a gimbal 22...

13/3,K/5 (Item 5 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
(c) 2003 European Patent Office. All rts. reserv.

00351068

**Stepper for circuit pattern formation.**

**Sequenzvorrichtung zur Bildung von Schaltkreisen.**

**Dispositif de sequence pour la formation de circuits integres.**

PATENT ASSIGNEE:

FUJITSU LIMITED, (211460), 1015, Kamikodanaka Nakahara-ku, Kawasaki-shi  
Kanagawa 211, (JP), (applicant designated states: DE)

INVENTOR:

Tabata, Fumio c/o FUJITSU LIMITED, Patent Department 1015 Kamikodanaka  
Nakahara-ku, Kawasaki-shi Kanagawa 211, (JP)

Sekiguchi, Hidenori c/o FUJITSU LIMITED, Patent Department 1015  
Kamikodanaka Nakahara-ku, Kawasaki-shi Kanagawa 211, (JP)

Kamada, Toru c/o FUJITSU LIMITED, Patent Department 1015 Kamikodanaka  
Nakahara-ku, Kawasaki-shi Kanagawa 211, (JP)

Sakata, Yuji c/o FUJITSU LIMITED, Patent Department 1015 Kamikodanaka  
Nakahara-ku, Kawasaki-shi Kanagawa 211, (JP)

LEGAL REPRESENTATIVE:

Sunderland, James Harry et al (47951), HASELTINE LAKE & CO Hazlitt House  
28 Southampton Buildings Chancery Lane, London WC2A 1AT, (GB)

PATENT (CC, No, Kind, Date): EP 360272 A2 900328 (Basic)

EP 360272 A3 910502

EP 360272 B1 931201

APPLICATION (CC, No, Date): EP 89117492 890921;

PRIORITY (CC, No, Date): JP 88237807 880922; JP 88263184 881019

DESIGNATED STATES: DE

INTERNATIONAL PATENT CLASS: G03F-007/20;

ABSTRACT WORD COUNT: 273

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	EPBBF1	2317
CLAIMS B	(German)	EPBBF1	1156
CLAIMS B	(French)	EPBBF1	1438
SPEC B	(English)	EPBBF1	6194
Total word count - document A			0
Total word count - document B			11105
Total word count - documents A + B			11105

...SPECIFICATION coarse X-Y stage 34, the pressure-reducing valves 36 and 37 are controlled by a **solenoid** valve, etc., such that the differential pressure P1-P2 is equal to a half of the total weight of both the stages. The **air cylinders** 25a to 25d **stabilise** a servo system of the wafer stage 12 comprising the **coarse** X-Y stage 34 and the fine X-Y stage 35 by a damper effect...

...of parallel plate spring guides 39 and a piezoelectric device 40 is used as an **actuator**. In order to form a **two - stage** structure, **two** single axis stages are superposed one upon the other as shown in Fig. 8. That...

13/3,K/6 (Item 1 from file: 349)  
DIALOG(R)File 349:PCT FULLTEXT  
(c) 2003 WIPO/Univentio. All rts. reserv.

00861664      \*\*Image available\*\*

**DUAL STAGE ACTUATOR SYSTEMS FOR HIGH DENSITY HARD DISK DRIVES USING ANNULAR  
ROTARY PIEZOELECTRIC ACTUATORS  
SYSTEMES D'ACTIONNEURS A DEUX ETAGES POUR DISQUE DUR HAUTE DENSITE  
UTILISANT DES ACTIONNEURS PIEZO-ELECTRIQUES ROTATIFS**

Patent Applicant/Assignee:

SAE MAGNETICS (H K ) LTD, SAE Tower, 15th Floor, 38-42 Kwai Fung  
Crescent, Kwai Chung N.T., Hong Kong Special Administrative Region, CN,  
CN (Residence), CN (Nationality)

Inventor(s):

WU Kai, Winnerway Industrial Area, Huangcun, Dongguan City, Guangdong  
Province 511700, CN,  
KASAJIMA Tamon, Winnerway Industrial Area, Huangcun, Dongguan City,  
Guangdong Province 511700, CN,  
SHIRAISHI Masashi, Winnerway Industrial Area, Huangcun, Dongguan City,  
Guangdong Province 511700, CN,  
SHANG Ping, Winnerway Industrial Area, Huangcun, Dongguan City, Guangdong  
Province 511700, CN,  
WANG Zhihong, School of Electrical and Electronic Engineering, Block S1,  
Sensors & Actuators Laboratory, Nanyang Technological University,  
Nanyang Avenue, Singapore 639798, SG,

Legal Representative:

CHINA PATENT AGENT (H K ) LTD (agent), 22/F Great Eagle Centre, 23  
Harbour Road, Wanchai, Hong Kong Special Administrative Region, CN,

Patent and Priority Information (Country, Number, Date):

Patent: WO 200195329 A1 20011213 (WO 0195329)  
Application: WO 2000CN148 20000608 (PCT/WO CN0000148)  
Priority Application: WO 2000CN148 20000608

Designated States: CN

Publication Language: English

Filing Language: English

Fulltext Word Count: 5265

English Abstract

...either a single plate or with multilayer structure. The present  
invention further relates to a **dual stage** head positioning **actuator**  
system of a hard disk drive with a plurality of disks and a plurality of

...  
?

17/3,K/1 (Item 1 from file: 348)  
DIALOG(R) File 348:EUROPEAN PATENTS  
(c) 2003 European Patent Office. All rts. reserv.

01436246

**A magnetic disk drive and the control method thereof**

**Magnetplattenlaufwerk und Steuervorrichtung**

**Unite de disque magnetique et sa commande**

PATENT ASSIGNEE:

Hitachi, Ltd., (204151), 6, Kanda Surugadai 4-chome, Chiyoda-ku, Tokyo  
101-8010, (JP), (Applicant designated States: all)

INVENTOR:

Shimokoshi, Masayoshi, c/o Hitachi Ltd., IPG, New Marunouchi Bldg., 5-1,  
Marunouchi 1-chome, , Chiyoda-ku, Tokyo 100-8220, (JP)

Doi, Takeshi, c/o Hitachi Ltd., IPG, New Marunouchi Bldg., 5-1,  
Marunouchi 1-chome, , Chiyoda-ku, Tokyo 100-8220, (JP)

LEGAL REPRESENTATIVE:

Strehl Schubel-Hopf & Partner (100941), Maximilianstrasse 54, 80538  
Munchen, (DE)

PATENT (CC, No, Kind, Date): EP 1220207 A2 020703 (Basic)

APPLICATION (CC, No, Date): EP 2001115827 010628;

PRIORITY (CC, No, Date): JP 2000355642 001117; JP 2001112163 010411

DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI;  
LU; MC; NL; PT; SE; TR

EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI

INTERNATIONAL PATENT CLASS: G11B-005/55; G11B-005/596; G11B-021/08

ABSTRACT WORD COUNT: 139

NOTE:

Figure number on first page: 5

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200227	1844
SPEC A	(English)	200227	6146
Total word count - document A			7990
Total word count - document B			0
Total word count - documents A + B			7990

...SPECIFICATION and a precision control mechanism for performing a precision positioning.

A typical example of the **two - stage actuator** has a precision control mechanism installed either on a head suspension itself **mounted** on a conventional rotary actuator or directly on a **magnetic head-mounting slider**. The precision control is done by using a piezoelectric element, and the **magnetic** head is finely oscillated by the piezoelectric element which is **mounted** either on the head suspension or directly on the **slider** having the **magnetic** head. The "oscillation of the **magnetic** head" means finely moving the **magnetic** head by sending a signal to the precision control mechanism of the **two - stage actuator** or applying predetermined displacements to it.

Although the periodic oscillation is expected to reduce the...magnetic disk drive is normally filled with air and the viscosity of air between the **magnetic** disk medium and the slider mounting the **magnetic** head may cause pitching vibrations which are not desirable to the drive. The oscillation frequency...

...to 300 kHz and must be avoided. Further, the characteristics of the element of the **two - stage actuator** that performs the precision control and the inertial mass and others of the **magnetic head-mounting**

**slider** combine to determine the upper limit of the oscillation frequency, at around 500 kHz. If...

17/3,K/2 (Item 2 from file: 348)  
DIALOG(R)File 348:EUROPEAN PATENTS  
(c) 2003 European Patent Office. All rts. reserv.

01149356

HEAD SUPPORT MECHANISM, INFORMATION RECORDING / REPRODUCING APPARATUS, AND  
METHOD OF MANUFACTURING HEAD SUPPORT MECHANISM  
MAGNETKOPF-AUFHAENGUNG, INFORMATIONEN-AUFZEICHNUNGS- UND WIEDERGABEVORRICHTU  
NG, UND EINE METHODE ZUR HERSTELLUNG EINER MAGNETKOPF-AUFHAENGUNG  
MECANISME DE SUPPORT DE TETE, APPAREIL D'ENREGISTREMENT / REPRODUCTION  
D'INFORMATIONS ET PROCEDE DE FABRICATION D'UN MECANISME DE SUPPORT DE  
TETE

PATENT ASSIGNEE:

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD., (216883), 1006, Oaza-Kadoma,  
Kadoma-shi, Osaka 571-8501, (JP), (Applicant designated States: all)

INVENTOR:

YOKOYAMA, Kazuo, 1-30-7 Kitayama, Hirakata-shi, Osaka 573-0171, (JP)  
YAMAMOTO, Shinichi, 174-10 Kuzuhamentori, Hirakata-shi, Osaka 573-1113,  
(JP)

IRIE, Yousuke, 44-405 Tsurumaidanchi, Iban, Tsurumaihighashimachi,  
Nara-shi, Nara 631-0021, (JP)

KUWAJIMA, Hideki, 36-3 Shimobettoucho, Kitashirakawa, Sakyo-ku,  
Kyoto-shi, Kyoto 606-8286, (JP)

SAKAMOTO, Kenichi, 1-4-1-223 Uenohigashi, Toyonaka-sshi, Osaka 560-0013,  
(JP)

MATSUOKA, Kaoru, 2-4-17 Morishoji, Asahi-ku, Osaka-shi, Osaka 553-0013,  
(JP)

KANNO, Isaku, 5-7-22, Tezukayama, Nara-shi, Nara 631-0062, (JP)

FUJII, Satoru, 1-14-12 Tsukawaki, Takatsuki-shi, Osaka 569-1036, (JP)

LEGAL REPRESENTATIVE:

Schwabe - Sandmair - Marx (100951), Stuntzstrasse 16, 81677 Munchen, (DE)  
PATENT (CC, No, Kind, Date): EP 1152401 A1 011107 (Basic)

WO 200016318 000323

APPLICATION (CC, No, Date): EP 99943376 990916; WO 99JP5061 990916

PRIORITY (CC, No, Date): JP 98261147 980916; JP 98334802 981125; JP 9952015  
990226

DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI;  
LU; MC; NL; PT; SE

INTERNATIONAL PATENT CLASS: G11B-005/60

ABSTRACT WORD COUNT: 65

NOTE:

Figure number on first page: 1

LANGUAGE (Publication,Procedural,Application): English; English; Japanese  
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200145	3139
SPEC A	(English)	200145	13719
Total word count - document A			16858
Total word count - document B			0
Total word count - documents A + B			16858

...SPECIFICATION used in addition to the first stage or the main driving means. As such a **two - stage** controlled **actuator**, a mode in which a head support mechanism (i. e., suspension) is driven, a mode in which a slider is driven, a mode in which a head element is **mounted** on a



**slider** , and the like, have been devised.

The functions of a head support mechanism of a **magnetic** disk apparatus include pressuring a **slider** toward a disk against a force acting on the **slider** due to the proximity flying, or contact with, a rotating disk, causing the slider to...

...Speech Papers (IV) (1998, March 31 to April 3, Tokyo), pp. 208-209 discloses a **two - stage** controlled **actuator** mounted on a back face of a slider. This amounts to a driving mode in...

...above-described conventional example disclosed in Japanese Laid-open Publication No. 9-73746. Since this **two - stage** controlled **actuator** is of a type which is **mounted** on the back face of a **slider** , a thickness of the **magnetic** disk apparatus in a height direction thereof is increased, which hinders the reduction in size...

?

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Set	Items	Description
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S1 49167 ACTUATOR?  
 S2 102 S1(5N)(DUAL OR TWO)(3N)STAGE??  
 S3 0 ANNULAR?(10N)(PIEZOELECTRIC OR PIEZO()ELECTRIC)(S)CONCENTR-  
 IC?(S)ELECTRODE?  
 S4 0 ANNULAR?(S)(PIEZOELECTRIC OR PIEZO()ELECTRIC)(S)CONCENTRIC-  
 ?(S)ELECTRODE?  
 S5 9868 (RING OR C)() (SHAPE? OR CONSTRUCTION OR DESIGN??)  
 S6 75 RADIAL()GAP??  
 S7 29 FIX?()END(S)BASE  
 S8 1710 FREE()END  
 S9 34 (ATTACH? OR JOIN? OR MOUNT? OR PLACING OR PLACEMENT)(10N)M-  
 AGNETIC?(7N)SLIDER?  
 S10 13321 HDD OR HIGH()DENSITY()DIS??????()DRIVE??  
 S11 0 U=(SHANG, P? OR WU, K? OR KASAJIMA, T? OR SHIRAISHI, M? OR  
 SHANG P? OR WU K? OR KASAJIMA T? OR SHIRAISHI M?)  
 S12 0 S2(S)S5:S9  
 S13 6 S2(S)S10  
 S14 6 RD S13 (unique items)  
 S15 0 S5(S)S10  
 S16 0 S6:S9(S)S10

14/3,K/1 (Item 1 from file: 88)  
DIALOG(R)File 88:Gale Group Business A.R.T.S.  
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06301603 SUPPLIER NUMBER: 94130486  
**Manufacturing process of piezoelectric thin-film dual - stage actuator and its reliability for HDD .(hard disk drives) (Abstract)**  
Ku wajima, Hideki; Uchiyama, Hirokazu; Ogawa, Yuko; Kita, Hiroyuki; Matsuoka, Kaoru  
IEEE Transactions on Magnetism, 38, 5, 2156(3)  
Sept, 2002  
DOCUMENT TYPE: Abstract ISSN: 0018-9464 LANGUAGE: English  
RECORD TYPE: Abstract

**Manufacturing process of piezoelectric thin-film dual - stage actuator and its reliability for HDD .(hard disk drives) (Abstract)**

14/3,K/2 (Item 2 from file: 88)  
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05751883 SUPPLIER NUMBER: 73828395  
**Effect of Dual-Stage Actuator on Positioning Accuracy in 10k rpm Magnetic Disk Drives.**  
Koganezawa, Shinji; Hara, T.; Uematsu, Y.; Yamada, T.  
IEEE Transactions on Magnetism, 37, 2, 955  
March, 2001  
ISSN: 0018-9464 LANGUAGE: English RECORD TYPE: Abstract

AUTHOR ABSTRACT: We have developed a piezoelectric microactuator for dual - stage actuator systems in magnetic disk drives. We installed the microactuator in one of Fujitsu's 3.5-inch commercial drives for evaluation of the servo system of dual - stage actuator . The dual - stage actuator system achieved the nonrepeatable position error (NRPE) 3(Sigma) values of 0.036 (micro)m...

...system reduced the NRPE by 35% compared with the conventional single actuator system even in HDD 's which has a high rotational speed of 10 000 rpm.

Index Terms--Dual-stage...

14/3,K/3 (Item 3 from file: 88)  
DIALOG(R)File 88:Gale Group Business A.R.T.S.  
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05751880 SUPPLIER NUMBER: 73828392  
**Lifetime Prediction Method for Piggyback PZT Actuator.**  
Nakamura, Shigeo; Naniwa, Irizo; Sato, Kazutaka; Yasuna, Kei; Saegusa, Shozo  
IEEE Transactions on Magnetism, 37, 2, 940  
March, 2001  
ISSN: 0018-9464 LANGUAGE: English RECORD TYPE: Abstract

AUTHOR ABSTRACT: The experimental lifetime predictive equation for a piggyback PZT actuator was derived. A piggyback actuator is a fine actuator of a dual - stage servo system that is essential to increase the recording density of hard disk drives ( HDD 's). The obtained equation agrees with Arrhenius' equation. The lifetime of our developed actuator was

...

...years under heavy use conditions. This lifetime prediction method is useful for designing piggyback PZT actuators for high-performance HDD 's.

Index Terms-- Dual - stage servo system, hard disk drive, head positioning system, lifetime prediction, PZT actuator.

14/3,K/4 (Item 4 from file: 88)  
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05726478 SUPPLIER NUMBER: 72611197  
**A Design Method of a Multi-Rate Servo Controller Using H-Infinity.**  
Semba, Tetsuo  
IEEE Transactions on Magnetics, 36, 5, 2219  
Sept, 2000  
ISSN: 0018-9464 LANGUAGE: English RECORD TYPE: Abstract

AUTHOR ABSTRACT: A method of designing a multi-rate servo controller for a HDD that operates at a higher sampling frequency than that of the position error signal (PES) is proposed. Multi-rate sampling has an advantage for increasing the track density of a HDD without increasing the overhead of the servo information on the disk. A plant model for...

...servo bandwidth and margins of the method are studied for 2.5" and 3.5" HDD 's, and for a HDD with a dual - stage actuator . The multi-rate sampling is especially effective for the dual - stage actuator because the MEMS actuator 's transfer function is very clean.

Index Terms--DAC, estimator, HDD, interpolator, PES, predictor.

14/3,K/5 (Item 5 from file: 88)  
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05357086 SUPPLIER NUMBER: 60272407  
**Dual-Stage Servo Controller for HDD Using MEMS Microactuator.**  
Semba, Tetsuo; Hirano, Toshiki; Hong, John; Fan, Long-Sheng  
IEEE Transactions on Magnetics, 35, 5, 2271  
Sept, 1999  
ISSN: 0018-9464 LANGUAGE: English RECORD TYPE: Abstract

...AUTHOR ABSTRACT: microactuator provides a low-cost and high-performance solution to realize high track densities of HDD , because of the batch fabrication process and its clean mechanical characteristics. However, the servo system to control such a dual-stage system tends to be more complicated than a conventional HDD system. In this paper, a simple and efficient design method of a dual-stage servo controller for HDD applications is described. The experimental results of the track following control with the dual - stage actuator using a conventional VCM and a MEMS microactuator showed that the fourth-order servo controller...

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04223006 SUPPLIER NUMBER: 19264789

Micro electrostatic actuators in dual-stage disk drives with high track density. (The 1996 IEEE International Magnetism Conference) (INTERMAG '96)

Tang, Y.; Chen, S.X.; Low, T.S.

IEEE Transactions on Magnetics, v32, n5, p3851(3)

Sep, 1996

ISSN: 0018-9464

LANGUAGE: English

RECORD TYPE: Abstract

AUTHOR ABSTRACT: This paper presents a dual - stage actuator for high - density disk drive , using a voice coil motor (VCM) rotary actuator as a coarse actuator and a linear...

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L2: Entry 1 of 3

File: TDBD

Jun 1, 1995

TDB-ACC-NO: NN950613

DISCLOSURE TITLE: Miniature Rotary Optical Actuator

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KWIC	Draw Desc
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☐ 2. Document ID: NA84123920

L2: Entry 2 of 3

File: TDBD

Dec 1, 1984

TDB-ACC-NO: NA84123920

DISCLOSURE TITLE: Method to Reduce Track Misregistration on Dual Actuator Dasd

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KWIC	Draw Desc	Clip Img
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☐ 3. Document ID: NA82123533

L2: Entry 3 of 3

File: TDBD

Dec 1, 1982

TDB-ACC-NO: NA82123533

DISCLOSURE TITLE: Modular Linear Actuator. December 1982.

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KWIC	Draw Desc	Clip Img
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**WEST**[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 10 of 29 returned.**☐ 1. Document ID: NN9409683

L3: Entry 1 of 29

File: TDBD

Sep 1, 1994

TDB-ACC-NO: NN9409683

DISCLOSURE TITLE: Optical Recording/Erasure with Overlapping Focal Spots from Multiple Beams

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<a href="#">KVMC</a>	<a href="#">Draw Desc</a>
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☐ 2. Document ID: NA9001284

L3: Entry 2 of 29

File: TDBD

Jan 1, 1990

TDB-ACC-NO: NA9001284

DISCLOSURE TITLE: Filtration Scheme for a Disk

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<a href="#">KVMC</a>	<a href="#">Draw Desc</a>	<a href="#">Clip Img</a>
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☐ 3. Document ID: NN8903369

L3: Entry 3 of 29

File: TDBD

Mar 1, 1989

TDB-ACC-NO: NN8903369

DISCLOSURE TITLE: Crash End/Stop Pin

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<a href="#">KVMC</a>	<a href="#">Draw Desc</a>	<a href="#">Clip Img</a>
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☐ 4. Document ID: NN8712448

L3: Entry 4 of 29

File: TDBD

Dec 1, 1987

TDB-ACC-NO: NN8712448

DISCLOSURE TITLE: Compact Diskette Drive

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KVMC	Draw Desc	Clip Img
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☐ 5. Document ID: NN85122975

L3: Entry 5 of 29

File: TDBD

Dec 1, 1985

TDB-ACC-NO: NN85122975

DISCLOSURE TITLE: Instrument for Testing Thin Films Such As Magnetic Tape

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KVMC	Draw Desc	Clip Img
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☐ 6. Document ID: NB85036100

L3: Entry 6 of 29

File: TDBD

Mar 1, 1985

TDB-ACC-NO: NB85036100

DISCLOSURE TITLE: Keyboard Tilt Mechanism

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KVMC	Draw Desc	Clip Img
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☐ 7. Document ID: NA82123533

L3: Entry 7 of 29

File: TDBD

Dec 1, 1982

TDB-ACC-NO: NA82123533

DISCLOSURE TITLE: Modular Linear Actuator. December 1982.

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KWIC	Draw Desc	Clip Img
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☐ 8. Document ID: NN82112906

L3: Entry 8 of 29

File: TDBD

Nov 1, 1982

TDB-ACC-NO: NN82112906

DISCLOSURE TITLE: Torsional Resonance Damping of Rotary Actuator. November 1982.

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KWIC	Draw Desc	Clip Img
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☐ 9. Document ID: NN8207829

L3: Entry 9 of 29

File: TDBD

Jul 1, 1982

TDB-ACC-NO: NN8207829

DISCLOSURE TITLE: High Performance Rotary Actuator Motor. July 1982.

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KWIC	Draw Desc	Clip Img
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☐ 10. Document ID: NN81081477

L3: Entry 10 of 29

File: TDBD

Aug 1, 1981

TDB-ACC-NO: NN81081477

DISCLOSURE TITLE: Self Pressurized Air Bearings for Disk File Actuators. August 1981.

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L3: Entry 11 of 29

File: TDBD

Oct 1, 1980

TDB-ACC-NO: NN80102120

DISCLOSURE TITLE: Web Holding Device. October 1980.

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KWIC	Draw Desc	Clip Img
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☐ 12. Document ID: NB80013762

L3: Entry 12 of 29

File: TDBD

Jan 1, 1980

TDB-ACC-NO: NB80013762

DISCLOSURE TITLE: Closed-Loop Step Servo System. January 1980.

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☐ 13. Document ID: NA80013200

L3: Entry 13 of 29

File: TDBD

Jan 1, 1980

TDB-ACC-NO: NA80013200

DISCLOSURE TITLE: Pluggable Module Assembly. January 1980.

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☐ 14. Document ID: NN7907780

L3: Entry 14 of 29

File: TDBD

Jul 1, 1979

TDB-ACC-NO: NN7907780

DISCLOSURE TITLE: Force Constant Linearity Optimization Techniques As Applied To A Long Gap, Short Coil Linear Actuator. July 1979.

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☐ 15. Document ID: NN7906360

L3: Entry 15 of 29

File: TDBD

Jun 1, 1979

TDB-ACC-NO: NN7906360

DISCLOSURE TITLE: Contamination Control System For A Disk Cartridge. June 1979.

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KWIC	Draw Desc	Clip Img
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☐ 16. Document ID: NN79044636

L3: Entry 16 of 29

File: TDBD

Apr 1, 1979

TDB-ACC-NO: NN79044636

DISCLOSURE TITLE: Commutated Voice Coil. April 1979.

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☐ 17. Document ID: NN77101986

L3: Entry 17 of 29

File: TDBD

Oct 1, 1977

TDB-ACC-NO: NN77101986

DISCLOSURE TITLE: An Actuator Transit Latch. October 1977.

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☐ 18. Document ID: NN77023561

L3: Entry 18 of 29

File: TDBD

Feb 1, 1977

TDB-ACC-NO: NN77023561

DISCLOSURE TITLE: Symmetrically Floated Voice Coil Actuator. February 1977.

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☐ 19. Document ID: NN76112036

L3: Entry 19 of 29

File: TDBD

Nov 1, 1976

TDB-ACC-NO: NN76112036

DISCLOSURE TITLE: Print Hammer. November 1976.

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☐ 20. Document ID: NN7607657

L3: Entry 20 of 29

File: TDBD

Jul 1, 1976

TDB-ACC-NO: NN7607657

DISCLOSURE TITLE: Relatch Actuator Plates. July 1976.

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L3: Entry 21 of 29

File: TDBD

Jan 1, 1973

TDB-ACC-NO: NN73012505

DISCLOSURE TITLE: Vacuum Operated File Protect Switch Assembly. January 1973.

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☐ 22. Document ID: NN72022847

L3: Entry 22 of 29

File: TDBD

Feb 1, 1972

TDB-ACC-NO: NN72022847

DISCLOSURE TITLE: Mechanically Actuated Electric Switch. February 1972.

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☐ 23. Document ID: NN71033041

L3: Entry 23 of 29

File: TDBD

Mar 1, 1971

TDB-ACC-NO: NN71033041

DISCLOSURE TITLE: Tape File Protection Mechanism. March 1971.

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☐ 24. Document ID: NN70101326

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File: TDBD

Oct 1, 1970

TDB-ACC-NO: NN70101326

DISCLOSURE TITLE: Linear Actuator Electric Machine. October 1970.

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☐ 25. Document ID: NN7009978

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File: TDBD

Sep 1, 1970

TDB-ACC-NO: NN7009978

DISCLOSURE TITLE: Linear Actuator with Shorted Turn to Reduce Coil Inductance. September 1970.

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☐ 26. Document ID: NN6610548

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File: TDBD

Oct 1, 1966

TDB-ACC-NO: NN6610548

DISCLOSURE TITLE: Article Handling Apparatus. October 1966.

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☐ 27. Document ID: NN620537

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File: TDBD

May 1, 1962

TDB-ACC-NO: NN620537

DISCLOSURE TITLE: Actuating Transducer Heads. May 1962.

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☐ 28. Document ID: NN620110

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File: TDBD

Jan 1, 1962

TDB-ACC-NO: NN620110

DISCLOSURE TITLE: Percussion Welding Head. January 1962.

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☐ 29. Document ID: NN610822

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File: TDBD

Aug 1, 1961

TDB-ACC-NO: NN610822

DISCLOSURE TITLE: Linear Actuator. August 1961.

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